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Columnea × euphora, a New Hybrid

Harold E. Moore, Jr.

A hybrid Columnea which shows some promise of horticultural value was produced at Cornell University by Owen M. Rogers in 1953. Its parents are Columnea gloriosa, the showy vining species frequently cultivated in the United States, and C. lepidocaula, a less common orange- and yellow-flowered shrubby species from Costa Rica.

Unfortunately, the progeny have been dispersed so that a complete account of the variation in the first generation cannot now be given. A vigorous plant selected for retention at Cornell University is now flowering abundantly. The stems branch repeatedly almost throughout their length. They retain the graceful habit of C. gloriosa but are much stouter. Foliage retains the general shape of that in C. gloriosa but is considerably larger, less prominently hairy, and of a rich deep green.

Almost every node bears a flower. These are about 7 cm. long, in shape resembling those of C. lepidocaula, with the upper lip narrower than in C. gloriosa. Predominant colors are vermilion (Royal Horticultural Society Color Chart 18) ageing to nearly blood-red (R.H.S. Chart 820) on the back and lips of the corolla, chrome yellow (R. H. S. Chart 605) on the lower side of the corolla-tube. The calyx has retained the spreading, arched lobes of C. gloriosa. The luxuriant growth and abundant production of flowers suggest the epithet euphora which means productive or bearing well.

Columnea × euphora new hybrid (C. gloriosa ♀ × C. lepidocaula ♂).

Hybrida inter parentes intermedia caulibus robustis pendulis foliis ovatis floribus solitariis 7 cm. longis calycis lobis eis C. gloriosae similibus corolla ea C. lepidocaulae simili sed rubra filamentis pilosiusculis.

Type: Cultivated at Cornell University, Ithaca, New York, Nov. 1956, H. E. Moore, Jr. 7200 in Bailey Hortorium.

Stems of Columnea × euphora are robust, about 5 mm. in diameter and to nearly 1 meter in length. Young growth is green with a dense cover of short red-tipped hairs; older growth is brown

with hairs often dirty-white. Opposite ovate leaves to 5.5 cm. long, 3 cm. wide, and rounded or obliquely subcordate at the base, are dark green and densely hairy with very short, erect, pale hairs above, paler and similarly hairy below, especially on the 3-4 pairs of prominent veins. Flowers are solitary in the leaf-axils on densely pale- or red-tipped-hairy pedicels 2 cm. long. These are stout, curved upward, and thickened below the calyx of spreading, densely hairy, ovate, green lobes to 1 cm. long, 7 mm. wide. The corolla, 7 cm. long, with a slender curved tube about 3.3 cm. long, is vermilion shading to yellow on the lower side of the tube. The blunt or slightly notched upper lip has triangular lateral lobes; the lower lip is 2 cm. long, yellow at the basal sinuses. Soft, translucent, erect or spreading hairs about 2 mm. long cover the entire outer surface of the corolla, which has, in addition, a cover of shorter hairs on the inner surface of both lips. Filaments and style are shortly pilose as in C. lepidocaula.

Chromosomes of C. gloriosa were reported as 2n=18 in root-tips by Rogers in Baileya 2: 16 (1954). Columnea lepidocaula has a similar complement, counted but not previously reported by Rogers. Miss Catharine Fussell of Cornell University has determined the chromosome number of Columnea × euphora as n=9 from sporocyte material.

Fig. 1. Columnea x euphora: a, habit x 2/5; b, flower x 4/5.

The Early-flowering Magnolias of Japan

Benjamin Blackburn
Drew University
Madison, New Jersey

The early-flowering magnolias constitute a natural group intriguing botanically and beguiling horticulturally. As landscape subjects they have highest qualifications, and their showy bloom has gained them a popularity which makes those from Japan among the most prized plants in our gardens. Of the two similar species from China, one is in limited cultivation and still a collector's item, and the other is not available at present.

Star Magnolias were among the many plants admired in Japanese gardens by early travellers, and Kaempfer, Thunberg, and Siebold all reported this beautiful subject, which is the outstanding shrublike member of the group. Thunberg noted that it was always growing in gardens or as a potted plant; the Japanese name, Shide-Kobushi means "Kobus of homes." When Siebold's notes were put into printed form, the plant was named Buergeria stellata, but despite the Bavarian physician's keen interest in starting a nursery which would offer such floral treasurers of Japan to European connoisseurs, he did not succeed in introducing this plant. In view of the almost impossible obstacles placed in the way of foreign trade by the Shoguns, it is amazing that Siebold managed to introduce any Japanese plants at all for the nursery which he founded at Leyden about 1850.

The distinction of introducing Star Magnolias to Western gardens seems to have become a close contest, particularly as Commodore Perry's negotiations with the Tokugawa Shogun from 1852 to 1854 resulted in sweeping changes in the treatment given foreigners. Siebold returned to Japan in 1856 and had quantities of Japanese nursery stock prepared for shipment to Holland. Late in the 1850's and early in the 1860's, Robert Fortune, Richard Oldham, and John Gould Veitch, all of Great Britain, Carl Maximowicz on behalf of Alexander II of Russia, and Dr. George Rogers Hall of Bristol, Rhode Island, were assiduously collecting plants in Japan for their respective interests. Dr. Hall captured this prize, as well as numerous others. He returned home late in 1861 or early

the next year, and this was one of the two magnolias in a lot of some 40 plants which he turned over to the Parsons brothers for propagation and distribution through their nursery at Flushing, Long Island.

In Volume 13 (1878) of his magazine, The Garden, William Robinson, the famous revolutionary figure in British landscape gardening, published a fine colored plate of Star Magnolia and extracts from a letter from Samuel Parsons of Flushing. Two fully opened flowers on the carefully drawn branchlet show 13 and 15 petals. Of the consignment of plants he had received in 1862 from Dr. George Hall, Samuel Parsons wrote, "Among the plants were two Magnolias, one of which we named Halleana, after Dr. Hall, the other Thurberi, after Dr. Thurber. The former proved a gem, but for various reasons our propagation of it was small until 1869, when its merits, clearly displayed in large plants, induced us to extend its cultivation by all the means in our power... [Flowers] when fully opened will often measure 4 in. in diameter. The individual petals are 3/8 to 1/2 in. wide, and 1 1/2 in. to 2 in. long." When nearing the age of 100 years, one of Dr. Hall's original plants at Bristol, Rhode Island, as last admired by the writer in 1953, was nearly 4.5 m. high and about the same in spread.

Oldham obtained plants of Shide-Kobushi in Nagasaki in 1862, but apparently they died on the voyage to England or after reaching this destination.

As a final note in these historical details, it is of interest that when he returned to St. Petersburg in 1864, Maximowicz brought with him 72 chests of herbarium specimens, 300 different kinds of seeds, and about 400 living plants. Among the latter was at least one specimen of the plant he later called Magnolia stellata.

The similar early-flowering Magnolia Thurberi was introduced again in 1865 by Thomas Hogg, a New Yorker who held a diplomatic post in Japan from 1862 to 1870. Thomas and his brother James had continued their father's nursery at 79th Street and the East River, and after Thomas received the appointment from President Lincoln and went to Japan, he sent home seeds of many Japanese plants. Most of these were grown in their nursery, and some were also turned over to the Parsons at Flushing. Among the latter were Cornus Kousa, the Asiatic counterpart of our Flowering Dogwood, and the graceful new magnolia. Eventually it came to be realized that this was the species named M. Kobus in 1818 by Augustin DeCandolle, who appropriately incorporated the Japanese common name in his binomial. Flowers of typical M. Kobus have from 6 to 9 oblong-obovate petals, and this small tree blooms at practically the same time as Star Magnolias. The latter are readily distinguished by their dwarf rounded habit and flowers with more numerous narrow petals as described above.

Fig. 2. Magnolia salicifolia. (Redrawn from Faxon in Garden and Forest 6: fig. 12 [1893].)

One other early-flowering species, M. salicifolia, was known to collectors in Japan, and it had been described by Siebold. This was not introduced to Western gardens until 1892, when Professor C. S. Sargent of the Arnold Arboretum and Mr. James H. Veitch of the English nursery firm were travelling with the Japanese naturalist Tokubuchi in northern Honshu. In October of that year, they made a fine collection of seeds on Mount Hakkoda, near Aomori. The following month, apparently collecting alone, Professor Sargent found a single tree of the Willowleaf or Anise Magnolia in the hills below Mount Ontake, about 200 miles farther south, and it seems he gathered seeds here also. These lots of seeds were handled with success at the Arnold Arboretum, but Anise Magnolias have never gained deserved popularity in this country - probably because the field for an early-flowering white representative had been occupied so firmly by Star Magnolias. Another factor may well be that seedlings grown from the original specimens at the Arboretum and distributed as small plants before their floral characters could be verified have proved disappointing. In many cases they seem not to have been true M. salicifolia, but results of crosses with Kobus and Star Magnolias (M. × Proctoriana), and, perversely enough, many failed to show the good traits of either parent. However, it is interesting that an attractive hybrid, presumably with Star Magnolia, is pictured in Millais' "Magnolias," facing page 214, erroneously labelled M. salicifolia. True Anise Magnolias have fragrant flowers with six white petals and three lanceolate sepals 2 to 3 cm. long (half as long as the petals). The magnolia seeds collected by James H. Veitch on Mount Hakkoda failed to germinate.

Accounts of M. salicifolia sometimes mention the variation Millais called fasciata (which he also wrote as fastigiata), a name applied to upright-branched and rather densely conical shrublike specimens originating from plants imported from Japan early in this century. This might be assumed to be a selection or clone grown in Japanese nurseries, but data on its origin are not available. A specimen of this upright form growing in Highland Park, Rochester, New York, has been the seed parent of an unusually interesting lot of hybrids. Some are concluded to be the results of crosses with M. × Soulangiana, and the hybrid has been named M. × Slavinii by Bernard Harkness, taxonomist for the Rochester Department of Parks and Recreation. Plants of this hybrid first flowered in 1917; they have proved unusually vigorous and floriferous, and, in fact, much more striking landscape subjects than the parent selection of M. salicifolia.

Seedlings of Kobus Magnolias frequently provide surprises, also, and the taxonomic considerations of this species have been confused. The type of the species (M. Kobus var. Kobus) is considered to be the graceful and openly branched small tree occa-

Fig. 3. Magnolia Kobus var. borealis. (Redrawn, with changes, from Faxon in Garden and Forest 6: fig. 11 [1893], "Magnolia Kobus.")

sionally reaching a height of 10 m. and with a trunk sometimes 3 dm. in diameter. In most gardens, however, it is a smaller tree. The flowers have 6 to 9 petals, white in the main but often with pinkish midveins or pinkish shading at the very base, and three delicate fugacious sepals 1 - 1 1/2 cm. long. Flowers with the larger number of petals tend to be more open and saucer-shaped, while others, especially those with only 6 or 7 petals, often form goblet-shaped flowers with the petals remaining somewhat pressed together. One of these poorer examples is pictured in Millais' "Magnolias" facing page 154, but in its best forms Kobus has an abundance of satiny white flowers opening quite flat, with the delicate petals giving a very pleasing informality.

In northern Honshu and especially in the northern island of Hokkaido, M. Kobus is seen as much larger and more vigorous trees occasionally reaching heights of 24 m. and more, and with trunks up to 1 m. in diameter. Although more slender and with darker, more close bark, these trees suggest American Cucumber-trees (M. acuminata) in their dominant main trunk. This similarity continues in their conical outline under forest conditions, as well as their habit of expanding into broadly spreading subjects in open situations. (It is baffling and obviously ridiculous that these trees of conical outline - and many trees of similar habit - are so often described as "pyramidal." Obviously, there is never anything flat-sided or pyramidal about them!) Seeds of the northern Kobus had been sent to the Arnold Arboretum in 1876 by William Smith Clark, first president of the Massachusetts Agricultural College, who was on two years' leave to organize an agricultural college in Hokkaido. Plants from Dr. Clark's gift were flowering in the 1890's in Massachusetts, and in summarizing his notes on the forest trees of Japan, Professor Sargent designated the northern trees as a natural variety, M. Kobus var. borealis.

These Hokkaido Magnolias come remarkably true from seed, and young plants can be recognized by their unusual vigor and leaves of thicker texture with more prominently impressed veins. Young plants usually start to flower when they are 4 to 5 m. high, and in this most vigorous magnolia these dimensions indicate plants only six or seven years from seed. Some complaints about their tardiness in flowering are due to inevitable comparisons with Star Magnolias, grafted plants of which bloom when only a few centimeters high. Some individuals of variety borealis, such as one at the University of Washington Arboretum at Seattle, are superior in bloom. Most specimens have flowers indistinguishable from the botanical type, including some, as noted above, which seem mediocre for magnolias and do not open too attractively.

It may be significant that occasional seedlings of typical M. Kobus, which volunteer freely in favorable locations, show the more vigorous, excurrent growth habit and larger leaves of variety

borealis. While comparisons between plants in similar environments continued to their maturity are necessary to confirm this behavior, it may be that the Hokkaido Magnolia should be interpreted as the prototype of the species as an entity.

A truly amazing situation exists in the case of seedlings of Star Magnolias, and a review of the evidence indicates that these favorite plants must be given a reduction in taxonomic status and classified as a subsidiary of M. Kobus - M. Kobus var. stellata. It is generally recognized by nurserymen and other growers, particularly in Japan and on the continent of Europe, that only a small ratio of Star Magnolia seedlings produce plants reasonably like their parent and distinguished by the familiar dwarf, rounded, shrubby habit and unusually abundant flowers with numerous narrow petals. It appears that about half the seedlings of Star Magnolias turn out to be typical M. Kobus, with open growth and flowers with 6 to 9 oblong-obovate petals. The remainder develop into plants of the same Kobus-like growth, but with intermediate flowers having from 7 to 14 of the broader-type petals. (These latter would correspond to the purported hybrid group M. × Loebneri.) Such seedling plants of Star Magnolias show the evanescent narrow sepals, about 1 cm. long, which are typical of M. Kobus.

If one examines opening flowers of Star Magnolias, it is easy enough to find the same Kobus-type sepals, though sometimes only one or two to a flower. In addition to the furry bud-scales, and usually falling with them, from one to three sepals are characteristic of opening flowers of Maximowicz's M. stellata, and the error which the meticulous Russian started in describing the sepals and petals as equal or alike undoubtedly arose from his studies of dried specimens after his return to St. Petersburg. In his review of the magnolias growing in Japan, in the Bulletin of the Academy of Science of St. Petersburg 17:418 (1872), the line "Sepala petaloidea petalis aequilonga" is applied to M. stellata and M. conspicua as he knew them.

It does not appear that this error with reference to M. stellata Maximowicz was corrected until 1950, when J. E. Dandy, Keeper of Botany at the British Museum, presented his concise treatment, "A Survey of the Genus Magnolia together with Manglietia and Michelia," at the Camellia and Magnolia Conference on April 5th. In this important contribution, five Asiatic magnolias comprise the Section Buergeria, characterized by "tepals very unequal, those of the outer whorl much shorter and simulating a calyx," and "flowers appearing before the leaves; inner (large) tepals white, sometimes tinged with rose or purple; Asiatic species." Dandy's accounting for the genus is followed by Colonel Johnstone as the taxonomic outline for his handsome and stimulating book, "Asiatic Magnolias in Cultivation," the most recent definitive work dealing with the

genus. (Inasmuch as the perianth segments of the magnolia flowers dealt with in these notes are so obviously unlike, they are referred to here as sepals and petals, and the unattractive term "tepal," applicable when the segments are not easily differentiated, is not used.)

Thus, while some seedlings of Star Magnolias develop into plants reasonably similar to the parent, a majority revert to the Kobus type, and some even show affinities with variety borealis. The small proportion which come reasonably true seem to have been the source of the several garden plants grown without precise distinction today, as well as the highly esteemed pink-flowered selections of recent years such as 'Waterlily' and 'Rubra'. One very effective pink-petalled clone consistently produces flowers with 30 to 34 petals and one or two (but rarely three) sepals; it also shows a tendency to grow much taller than Star Magnolias. The much older selection 'Rosea', of Japanese garden origin, though delicate and charming in bud, is of indifferent coloring when a pink-flowering magnolia is desired, but it is outstanding as a producer of fertile seeds. This quality of seed fertility undoubtedly varies considerably in the assortment of garden plants known as M. stellata in this country.

The plants described as hybrids under the name M. × Loebneri (M. Kobus × M. stellata) would seem to be only a segment of the intergrading individuals between typical M. Kobus and M. Kobus var. stellata. This anomalous group favors Kobus in habit of growth and produces flowers with 6 to 14 petals. Unless hybridity can be proved, it seems desirable that clones attributed to this combination be assigned to typical M. Kobus.

The combination M. × Proctoriana was originally made by Rehder to accommodate plants originating from crosses between M. salicifolia and M. stellata Maximowicz. With the transfer of the latter to infraspecific status under M. Kobus, the name M. × Proctoriana becomes available also for hybrids between M. Kobus and M. salicifolia. This second group of hybrids already exists in some abundance in cultivation, due in part, at least, to the practice of commercial growers of gathering seeds in plantings in which the component species were both growing. (However vexing a reassignment of the familiar M. stellata Maximowicz may be, it gives some comfort by obviating the need to remember the name of another hybrid group!)

The adverse psychological effect on botanists as well as on gardeners of changes in the names of familiar plants is a situation to which one can hardly be insensitive. Examples occur constantly, as the studies of plants progress and the knowledge of them takes on more orderly patterns. In the case of Kobus and Star Magnolias, it is taxonomic acceptance of realities that seems overdue, as

nurserymen and others of the gardening fraternity have made tacit recognition of the situation in their long-established customary propagation of Star Magnolias by vegetative means and accepting the failure of seedlings to reproduce the parent with much reliability.

Several of the early references to Star Magnolias as growing native in Kyushu and on Mount Fuji seem to be erroneous, and these persist in Western references although repudiated in modern Japanese manuals. The writer succeeded in finding only M. Kobus in the Fuji and Hakone areas in the blooming season in 1946. A message from the late Dr. Tomitaro Makino on September 24, 1953, may be quoted in this connection: "Magnolia stellata is native, but it is not in every part of Japan. We can find it only in Owari and Mikawa areas in Japan as a native plant. In other areas, it [is found] only as a plant of gardens. This is an [authentic] Japanese plant." Owari and Mikawa make up a small district east of Nagoya in central Japan - the section where it was collected by Tschonoski, the skilled Japanese assistant of Maximowicz.

The following key is offered to assist in identifying the magnolias treated above during as much of the year as possible - in contrast with a key based on floral structures. Leaf and shoot characters are best taken as averages from several normal leaves and shoots (growths of the current year).

Key to the early-flowering Japanese magnolias

1. Leaf-blades widest below the middle, glaucous beneath; leaf-buds of matured growth glabrate. . . . . M. salicifolia

1. Leaf-blades widest above or near the middle, not or rarely glaucous; leaf-buds finely and persistently hairy.

   2. Growth open and tree-like; shoots glabrate, or with hairs persisting only over the short internodes below the terminal bud and at the nodes; flowers with 6-12 petals.

      3. Leaves generally elliptic to oblong, often with marked anise fragrance when crushed. . . . . M. × Proctoriana (It is anticipated that M. × Slavinii would also come to this point.)

      3. Leaves oblong-obovate or obovate, with slight or negligible fragrance.

         4. Leaves normally less than 10 cm. long; branchlets slender and shoots less than 4 mm. in diameter at the internodes. . . . . M. Kobus var. Kobus

         4. Leaves mostly more than 10 cm. long on outside shoots; branchlets stout and leading shoots more than 5 mm. in diameter at the base. . . . . M. Kobus var. borealis

   2. Growth compact and rounded; shoots prominently and densely hairy, becoming glabrate in patches; flowers with more than 12 petals. . . . . M. Kobus var. stellata

Synonymy and References

Magnolia salicifolia (Siebold & Zuccarini) Maximowicz in Bull. Acad. Sci. St. Petersb. 17: 419 (1872).
Buergeria salicifolia Siebold & Zuccarini in Abh. Math.-Phys. Cl. Akad. Wiss. Munch. 4 (2): 187 (1843).

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Magnolia salicifolia var. fastigiata Millais, Magnolias, 212 (1927), nomen nudum.
Magnolia salicifolia var. fasciata Millais, Magnolias, 213 (1927).

Magnolia × Proctoriana Rehder emend. Blackburn, sensu ampliore. (M. Kobus × M. salicifolia.)
Magnolia Proctoriana Rehder in Jour. Arnold Arb. 20: 412 (1939). (M. salicifolia × M. stellata.)
Magnolia kewensis auctores, (?) nomen subnudum. (M. Kobus × M. salicifolia.)

Magnolia × Slavinii Harkness in Nat. Hort. Mag. 33 (2): 11 (1954); The Garden Journal 5 (2): 37 (1955). (M. salicifolia × M. Soulangiana.)

Magnolia Kobus DeCandolle, Reg. Veg. Syst. 1: 456 (1818).
Magnolia Thurberi Parsons in The Garden 13: 572 (1878).
Magnolia × Loebneri Kache in Gartenschönheit 1: 20 (1920), pro parte. (M. Kobus × M. stellata). Clones cult.: 'Merrill', 'Willowwood'.

Magnolia Kobus var. borealis Sargent, Trees and Shrubs 2: 57 (1913).
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Magnolia Kobus var. stellata (Siebold & Zuccarini) Blackburn in Amatores Herbarii 17 (1-2): 1 (1955).
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Wyman, Donald. (Magnolia Loebneri) in Arnoldia 9 (3): 11 (1949); 12 (6): 45, t. 2 (1952).

ERRATA, VOLUME 4 (1956)

Page 15, line 13: for "surrounding" read "subtending."

Page 28, line 24: for "(fig. 13)" read "(fig. 14)."

Page 36, line 1 of legend, fig. 17: for "A. linifolia" read "A. linearis."

Page 46, line 4: for "Walter Dean Swingle" read "Walter Tennyson Swingle."

Page 50, line 23: for "$91.10" read "$9.10."

Page 101, line 17: for "2-5 cm." read "25 cm."

Page 102, line 7: for "1883" read "1683."

Page 125, line 20: for "Essex" read "Sussex."

Page 175, line 34: the correct price of Curtis's Botanical Magazine is about $12.50 per volume (four numbers), not per year (2 numbers).

Some New Trees for Southern Gardens

Edwin A. Menninger
Stuart, Florida

The following descriptions of exotic trees, now established in the United States, are taken partly from reference books of the native countries but are more frequently obtained by correspondence with foresters, botanists, and plantsmen who have furnished the seed. As far as I can determine, these are trees never before introduced into the United States.

Brachystegia spicaeformis Bentham (Leguminosae - subfamily Caesalpinioideae). In the tropics, where most trees are evergreen and no shortened days and frosty nights conduce to riots of fall leaf-coloring, trees are scarce that attract attention by the brilliance of their foliage. An exception is this common indigenous tree of Southern Rhodesia, which in spring reverses the usual procedure and comes forth with a crop of new foliage as intensely and spectacularly colored as any autumnal show the Northern Hemisphere can offer. The chief beauty of the tree lies in its spring foliage. Under optimum conditions it can reach 100 feet [30 m.] or more, but normally remains about 40 feet [12 m.]. The flattened crown gives the tree an attractive shape. The leaflets, 3 to 5 pairs per leaf, are 3 to 4 inches [8-10 cm.] long and loosely hung so that they move readily and glisten in the sun. The flowers are not showy but are much favored by bees. (Described by G. L. Guy, Southern Rhodesia Forestry Commission.)

Triplaris guanaiensis Rusby (Polygonaceae). "Taxi" is the local name, and it is one of the most beautiful plants in the Amazon valley. In due time it will display its magnificent colorings in the parks of Florida. At first the great clusters of flowers are a whitish yellow, changing then to a light-green color, finally sweeping into a magnificent rose. These are followed by winged fruits in great rusty bouquets. (Described by R. L. Froes, Instituto Agronómico do Norte, Belém, Pará, Brazil.) The ten kinds of Triplaris trees in northern South America have the sexes on different trees; the female are the showy-flowered ones, the males much less conspicuous. All of them harbor colonies of ants in their hollowed branches and these run out to do battle if the tree is disturbed.

Anopyxis ealaensis Sprague (Rhizophoraceae). This big evergreen of the mangrove group grows in west tropical Africa from the Ivory Coast to the Belgian Congo, usually on maritime shores. It seems to offer outstanding possibilities in Florida and Gulf Coast swamp lands as a timber tree that will thrive where the water table is high and often bothers the roots of other timber trees. Anopyxis ealaensis becomes a tall tree to 100 feet [30 m.] and there are no branches on the trunk up to 60 feet [18 m.], making it ideal for lumbering. The wood is yellowish or olive-brown in the heart with slightly paler sapwood, fine-grained and compact, with some resemblance to box, very hard and durable, according to Dalziel, in "The Useful Plants of West Tropical Africa." He adds that on the Gold Coast it is much used for fuel and is regarded as a good timber. It is used in Liberia for planks and timbers. Chevalier suggests it as a possible substitute for boxwood in turnery. The flowers of Anopyxis are inconspicuous (illustrated in Hutchinson & Dalziel). The specific name refers to the town of Eala, in the Belgian Congo, where there is a botanical garden. In Florida the word "mangrove" is believed by most persons to be a kind of tree; actually the word refers to a manner of growth, and at least four different trees make up the thickets along Florida shores that are commonly called "mangrove." The "mangrove" trees, however, do mostly belong to the same natural family (Rhizophoraceae) and they have a lot in common; on most of them the seed germinates on the tree (if it fell off, it would probably drown). However, on A. ealaensis, which is in the same family, the seed falls off when ripe.

Fig. 4. Anopyxis ealaensis. (From Hutchinson and Dalziel, "Flora of West Tropical Africa," vol. 1, fig. 98 [1927].)

Cybistax antisyphilitica Martius (Bignoniaceae). The specific name suggests a native use for the tree in Brazil. Harry Blossfeld of São Paulo, who sent me the seed, wrote: "I have been able to observe a small native tree for some time; we dug it and planted it in the garden of a friend of mine. It was 3 feet tall and had flowers that made us sure it belongs to the Bignonia family. The leaves are parted in five leaflets, which suggested Tabebuia (ipe) to us. Unfortunately when we came across this small tree the flowers had withered completely. Now the tree has been re-established and this year flowered again for the first time. Our surprise was immense because this was the green-flowered ipe. I do not know if you have ever heard of it. Botanically it is Cybistax antisyphilitica Martius, and though it does not grow to give such a glorious show as the yellow ipe (Tabebuia chrysantha Nicholson) it is certainly a beautiful thing when in bloom and will attract much attention because of the clear yellowish-green flowers. We tried to identify the color by Koster's Color Guide, but in this book the color is not present nor any similar tonality." (There is a Panamanian tree in this family with greenish-yellow flowers, Godmania aesculifolia [Humboldt, Bonpland & Knuth] Standley, which is occasionally seen in Florida.)

Lecythis Zabucajo Aublet (Lecythidaceae). Best known of South American nuts in the American market is the Brazil nut, seed of a giant evergreen tree, Bertholletia excelsa Humboldt & Bonpland, which is not in cultivation in the United States. A better-tasting and more delicious nut, though not so commonly eaten here, is the Sapacaya, seed of an allied big evergreen tree of French Guiana, Lecythis Zabucajo. Forty-five species of Lecythis are found scattered from southern Brazil to Costa Rica, many of them imperfectly known, and the seeds or "nuts" of several are exported also under the name Sapacaya. The seeds of L. Zabucajo are somewhat larger than Brazil nuts, usually close to 3 inches [7 cm.] long, and differ from them in having a smooth and longitudinally-furrowed, somewhat corky, light-brown shell that is not sharply angled. They have a sweet and creamy kernel and are usually known in the trade as paradise or cream nuts. They are not extensively exported, partly because of the local demand for them in countries where they grow and also on account of the difficulty in collecting them. The bulk of the crop is eaten by monkeys and other animals of the forest. Most of the trees of this order are called monkey-pot because of their strange fruits; these are often used to trap monkeys. The big woody ball has a circular opening at the apex, closed by a lid which eventually falls away. The monkey reaches through the hole, grabs a nut, then cannot get his loaded fist out and will let himself be caught rather than release his grip. On L. Zabucajo this monkey-pot is a thick-shelled woody ball 8 inches [20 cm.] in diameter, dark brown when ripe. While this ball, the fruit, is

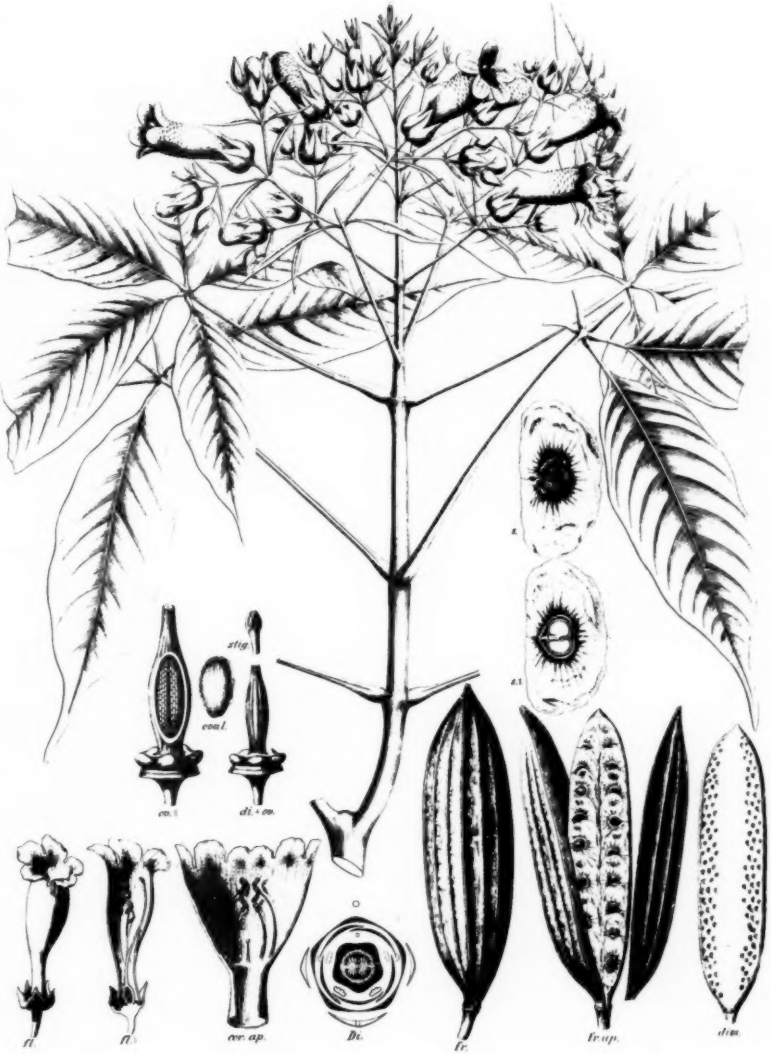


Fig. 5. Cybistax antisyphilitica. (From Martius, "Flora Brasiliensis" vol. 8, part 2: t. 115 [1897].)

still on the tree, the lid drops, permitting the seeds to escape. The empty shell remains long-suspended on the tree branch. In all species of Lecythis the general flower color is red or shades of red. In one species they are yellowish on the outside and red on the inside. The flowers of L. Zabucajo are whitish to rose-red and are about 1 1/2 inches [4 cm.] across. Although on a big tree they would hardly be conspicuous, they make a rosy carpet on the ground as they fall. The seeds of L. Zabucajo are difficult to germinate; planted flat in a shaded pot of vermiculite, only half-covered, they require a year to sprout.

Erioglossum rubiginosum Blume (Sapindaceae). This beautiful, big evergreen tree from Malaysia, which both in foliage and fruit resembles a Eugenia, is allied to the longan (Nephelium Longana Cambessèdes), which is not uncommonly planted as a street tree in Florida. Corner, in "Wayside Trees of Malaya," says: "Allowed to develop to perfection [E. rubiginosum] is a beautiful tree with

Fig. 6. Erioglossum rubiginosum. (From Ochse and Bakhuizen van den Brink, "Vegetables of the Dutch East Indies," fig. 396 [1931].)

soft, pale, drooping foliage, fragrant [honey-sweet] white panicles [of 1/4 inch flowers, never opening fully] and attractive bunches of fruits which pass through kaleidoscopic colours as they ripen [yellow, then orange, dull cherry-red, purple, and then nearly black]. The fruits are barely worth eating, though much relished by children who walk about with the grape-like bunches in their hands. The young shoots can be eaten as a vegetable [Ochse, "Vegetables of the Dutch East Indies," p. 651]...[It] flowers twice a year after the periods of dry weather. The male and bisexual flowers occur on the same panicles. The bisexual flowers occur singly in the flower-clusters near the base of the inflorescence and its branches, and they are the first to open: after they have flowered the males begin to open...Each panicle has therefore a short female phase of a few days, followed by a long male phase...and self-pollination is unlikely or impossible on the same inflorescence." The pulp of the fruit is thin, juicy, sweetish, and slightly astringent, without rind. The fruits, roots, and seeds enter into Malayan medicine as remedies for insomnia, fever, and whooping cough. (See Burkill, "A Dictionary of the Economic Products of the Malay Peninsula.")

Nephelium malaiense Griffith (Sapindaceae). Closely related to the Chinese litchi tree which it very much resembles in fruit, seed, and taste, this Malayan fruit tree, to 70 feet [21 m.] high, is popular in the villages where it is called Mata Kuching (Cat's Eyes). Corner's "Wayside Trees of Malaya" says of it: "Unfortunately the seed pulp is too meagre in most trees for it to have much value as a fruit, but fleshy kinds occur and should be selected...when grown to perfection, the Mata Kuching is one of the handsomest trees in the country. The flowers are borne in large, white, exceedingly fragrant panicles, but it seems that they are produced only once a year..." Burkill's "A Dictionary of the Economic Products of the Malaya Peninsula" says: "The globose, brown fruits are produced in big bunches. Within the shell is a thin, opalescent sweet aril on a deep-purple seed; this aril is much eaten by the Malays." The pulp separates from the seed, as does the litchi. As with other species of Nephelium, the male flowers and bisexual flowers are on different trees, but just how this condition functions is unknown. Corner observes that, of course, male trees do not bear fruit, but adds: "The bisexual trees carry pollen. It seems therefore that the male trees are useless though it is possible that the bisexual flowers must be cross-pollinated from the male trees to set fruit. The relation is not known." Corner says the property of the pulp, by which it separates from the seed at maturity, "appears to be the result of cultivation because it is seldom, if ever, found in wild fruits, e.g. plums, mangoes." He adds: "Mata Kuching and Litchi are placed by some botanists in a separate genus, mainly because the pulp of the seed is separable from the seed-coat, but there is little to gain from dissociating plants so obviously akin as these are with the 70 other species of Nephelium."

Sterculia rubiginosa Vent (Sterculiaceae). Commonly called Rusty Sterculia, this bushy evergreen or semi-deciduous tree to 30 ft. [9 m.] is found in the lowland forests of Burma, Indo-China, and western Malaya. The flowers are 1/2 inch [13 mm.] wide, pale yellow with pink hairs and edges, the inside of the cup crimson, in hanging sprays up to 10 in. [25 cm.] long. These are followed by velvety scarlet, 3 in. [75 mm.] pointed pods containing blue-black seeds. Corner says: "In Singapore, this little tree flowers twice a year, about January-March and July-September, after the spells of dry weather and it is one of the quickest trees to respond to these seasons... The trees are very attractive both in flower, with the sprays of pink bells, and in fruit."

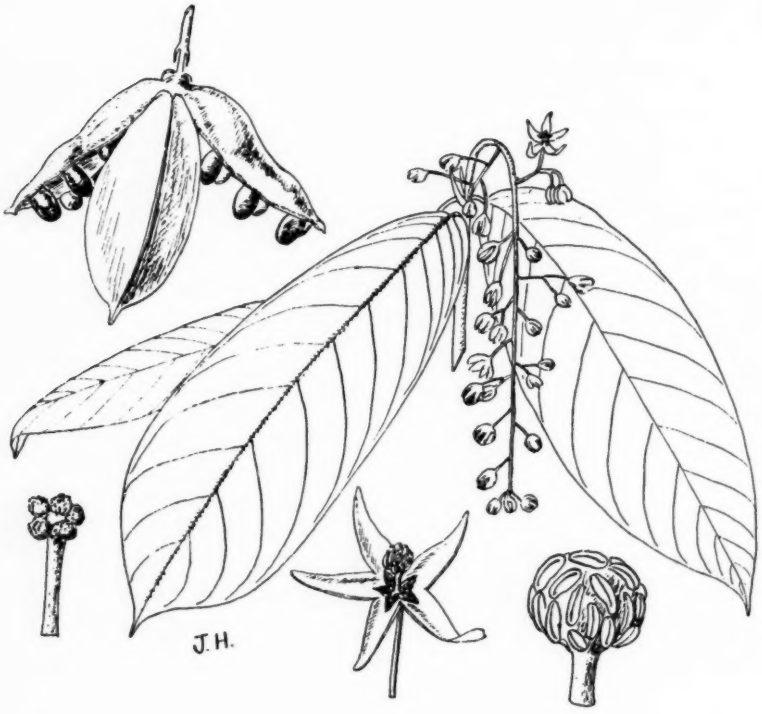


Fig. 7. Sterculia rubiginosa. (From Ridley, "Flora of the Malay Peninsula," vol. 1, fig. 27 [1922].)

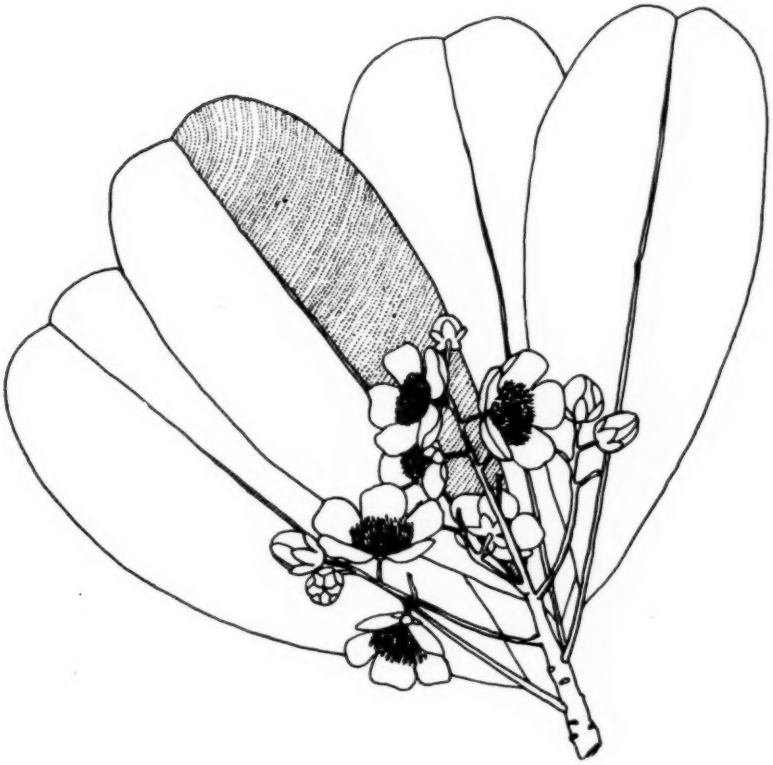


Fig. 8. Lophira alata.

Lophira alata Banks (Ochnaceae). Some years ago I received a packet of this seed from Dakar, West Africa, but from it I produced only one plant, which has grown nicely and is now several feet high. The black-and-white picture of the flowers in Hutchinson & Dalziel's "Flora of West Tropical Africa" excited my interest originally, and I was struck by the description of the tree's leaves as often 2 feet [6 dm.] long and up to 4 1/2 inches [11 cm.] wide - such a strange shape. As this plant has grown, I continue to marvel at the beautiful leaves which are almost sword-like and make you think of a fern of some sort. Hutchinson says the flowers are white or golden-yellow, fragrant, appearing mostly from December to February, and adds: "The young leaves [are] often bright red, and the wings of the fruit often crimson in the fresh state." I wrote my friend, E. Kerklen, Conservator of Waters and Forests at Abidjan, Ivory Coast, and asked him more about this tree and its flowers. He sent me a drawing of the leaves and flowers, which is reproduced here, and wrote me as follows (translated from the French): "Unfortunately, the flowers of Lophira alata are mostly at the tips of the branches, and, because it is a big tree of the moist forest, these are so high up that they are not readily seen from the ground. The tree is particularly remarkable for the young leaves of great size which are a beautiful red color when they appear. The winged fruits also are conspicuous on the tree." This was the extent of my information on this tree until recently I received a new book, "Flora of Senegal," published at Dakar. Lophira is illustrated in full color, showing the red leaves and the great clusters of pretty white flowers. I am more interested than ever in establishing this tree in Florida, because it could be kept smaller by pruning, and flowers at the branch-tips are often the showiest of all. Dr. David Fairchild shared my enthusiasm for this tree. In his book, "Exploring for Plants," now long out-of-print, he wrote: "The Lophira trees were in bloom on the north bank of the Gambia. Dr. Dalziel had talked a good deal about the beauty of their pink leaves as well as their cream-colored flowers and I must confess that I share his enthusiasm, for nothing could be prettier than the combination of those long sword-like delicate pink leaves with the great masses of flowers into which the tree bursts in January. Alas, to see the blooms of a tree is to miss the seed, and to this day no seeds have come."

Mayodendron igneum Kurz (Bignoniaceae). Burma is the home of this tree, the only species in the genus. It is related to our Tabebuia trees and is described as bearing orange tubular flowers in April and May. "Very pretty" says the descriptive list published by Narong & Sons of Bangkok, Thailand, from whom I imported one plant by air mail. It has been doing well in its new Florida home.

An Additional Remark on the Scarlet Episcias[1]

A. J. M. Leeuwenberg
Botanical Museum
State University
Utrecht, Netherlands

During a study of the Gesneriaceæ of the Guianas, the specimens upon which Martius based his description of the genus Episcia were compared with undetermined specimens from British and French Guiana and with material of Episcia fulgida from cultivation. When H. E. Moore visited Utrecht in September, 1956, we examined the material together and agreed that the plants cultivated as Episcia fulgida should be given the earlier name of Martius as follows:

Episcia reptans Martius, Nova Genera et Species Plantarum 3: 41, t. 217 (1829).

E. fulgida (Linden) Hooker f. in Botanical Magazine 100: t. 6136 (1874); Moore in Baileya 2: 75 (1954), who gives more extensive synonymy.

Cyrtodeira fulgida Linden, Catalogue 90: 5 (1873); André, Illustration Horticole 20: 107, pl. 131 (1873).

Martius started his genus Episcia with two species: E. decumbens and E. reptans. Episcia reptans has the habit of Episcia sensu stricto according to the traditional concept of the genus. Episcia decumbens, which is related to Nautilocalyx mimuloides (Bentham) Morton, has no stolons. Therefore, I propose to regard E. reptans as type-species of the genus.

During my studies of Episcia I could not find any difference between E. reptans and E. fulgida. Both have leaves with creamy-colored nerves which could also be observed on the specimens of Martius', who stated "folia..., obscure viridia, ad nervum medium carnosiusculum inferne prominentem albo-viridia." In his figures the sepals are entire, but on his specimens they are serrate as they are on Williams' specimen depicted by Hooker in the Botanical Magazine. The shape and the size of the corolla are also the same. The same is true for the stamens, ovary, style, and disk. The size of the leaves varies so much that it cannot serve as a differential character. Martius' specimens have stolons with young

[1] See Moore in Baileya 1: 46 (1953) and 2: 75 (1954).

plants, which also appear on Hooker's plate. It is likely that the colors of the plates, present in some copies of Martius' book, have been added later, because those of the leaves of the present species do not agree with his description. I propose to take up Linden's figure (Illustration Horticole 20: pl. 131 [1873]) as type of Cyrtodeira fulgida, because no type specimen was preserved. This figure, his description in the Catalogue No. 90, and that of André (1873) completely agree with those of Hooker.

The species occurs in Colombia, North Brazil (Amazonas, Minas Gerais, and Rio Branco), British and French Guiana.

Most important of the examined specimens:

Lectotype: Brazil, Japura, Martius 3091 (M).
Paratypes: Brazil, Japura, Martius s.n., herb. 93 (M); Rio Negro, Martius s.n., herb. 95 (M) and herb. 96 (M).
Others: Williams, cultivated in the Kew Gardens (K).

The Massachusetts Horticultural Society has announced that it expects to publish late in 1957 a new edition of the Plant Buyer's Guide now being prepared by H. Gleason Mattoon of Arlington, Vermont. The sixth edition of this source book will contain the most complete list available of seeds, plants, and bulbs which can be purchased by mail from American firms. In addition, a representative list of European sources will be included.

The fifth edition was compiled in 1948 when the nursery industry had not yet recovered from the effects of World War II. In contrast to the 35,000 plants which comprised the available list in the last edition, this new volume is expected to have more than twice as many, including new species, hybrids and varieties.

All nurseries which issue catalogues or plant lists have been asked to cooperate. Although announcements have been sent to more than 5,000 American firms and several hundred foreign ones, some dealers may have been overlooked. Those who have not received a letter are invited to send their catalogues or lists to Plant Buyer's Guide, H. Gleason Mattoon, Editor, Box 174, Arlington, Vermont.

Notes on Dracocephalum

James Keenan
Royal Botanic Garden
Edinburgh, Scotland

For several years the genus Dracocephalum has been studied at the Royal Botanic Garden, Edinburgh. This study originated as a result of finding misidentifications while assembling a herbarium of cultivated plants. The same thing happened, of course, in a number of other genera, but the case of Dracocephalum proved an interesting focus of discussion when Professor G. H. M. Lawrence visited Edinburgh in November last. The genus as grown in America has already been the subject of a paper by DeWolf (Baileya 3: 115-129 [1955]) and the cultivated species there are not greatly different from those in Europe. The conclusions reached at Edinburgh, however, by no means confirm the check list of names with which DeWolf concluded his paper. In fact, it is clear that lack of consultation of wild material prevented his really coming to grips with the problems of the cultivated plants.

Professor Lawrence requested these notes so that some of the errors in DeWolf's account might be rectified before they became established in horticultural usage. This has meant writing them during the winter months without further examination of living plants, and the illustrations have had to be taken from dried material. It should be understood that, although several species treated by DeWolf are not mentioned here, this does not imply acceptance of his findings nor agreement with his generic divisions.

From an examination of a wide range of both cultivated and wild material, it is obvious that an accurate assessment of the rank of the units involved must await more critical work than is necessary to provide names for the cultivated taxa. For these reasons the plants in cultivation are, in this account, merely intercalated with the taxa in botanical literature appropriate to them. It is the writer's belief that, in general, horticultural requirements from taxonomy are satisfied by the provision of an accurate reference point - the name. That this name be of greater or lesser rank than its entitlement is of minor consequence. The results of this approach in a work of limited purpose are certainly less harmful than the proposal of new combinations without the critical assessment of adequate wild material necessary to support them.

An illustration from the plants under review may clarify the reasons for this approach. Dracocephalum Purdomii W. W. Smith was regarded by Kudo as a variety of D. grandiflorum Linnaeus (D. grandiflorum var. Purdomii (W. W. Smith) Kudo, in Memoirs of the Faculty of Science and Agriculture, Taihoku Imperial University 2, no. 1: 239 [1929]). Dracocephalum Purdomii may well be of less than specific rank, but from examination of wild material, it is certainly not a variety of D. grandiflorum. However, Kudo's name must enter into botanical literature as a further burden to the synonymy of the genus.

The Dracocephalum tanguticum complex

This is certainly one of the most involved species complexes in the genus. Sometimes plants are found with smaller and often paler corollas. They also have small anthers, and, although these appear to be functional, it seems likely that such plants are correctly regarded as sex-forms approaching a functionally female condition. The occurrence of these forms makes the identification of some wild material difficult.

In the Chinese province of Yunnan almost all the species in this complex are to be found. Some are wide-ranging through Kansu and southeastern Tibet, others are restricted to midwestern Yunnan. From this region all specimens exhibit marked variability in characters generally fairly constant throughout the genus. Notably is this so of breadth of leaf-segment, ratio of calyx-tube to teeth, and degree and type of hair.

Until 1911, the year D. Isabellae was named, all pinnatifid-leaved Chinese dracocephalums had been referred to D. tanguticum. In 1916 Professor Wright Smith designated three more species, D. Forrestii, D. propinquum, and D. taliense. Dr. Handel-Mazzetti separated yet one other, D. calophyllum, in 1923. Only one Indian pinnatifid-leaved species, D. Hookeri, has been recognized. These seven names constitute the taxa of what is here called the tanguticum complex.

Dracocephalum tanguticum Maximowicz (Bulletin de l'Académie Impériale des Sciences, St. Pétersbourg 27: 530 [1881]) is a perennial pinnatifid-leaved herb of up to 50 cm. The internodes are long (2.5-5 cm.), the calyces are small (7-9 mm.), with short teeth half as long as the tube. The styles are exserted from violet-blue corollas which are 2.4-3 cm. in length.

Nicolas Przewalski found this species in Kansu in 1880, and it was named by Maximowicz in the following year. The isotype of this gathering, in the Edinburgh herbarium, has smaller corollas than the average for the species. In distribution it ranges from southwest Kansu to southeast Tibet and is represented in Szechuan

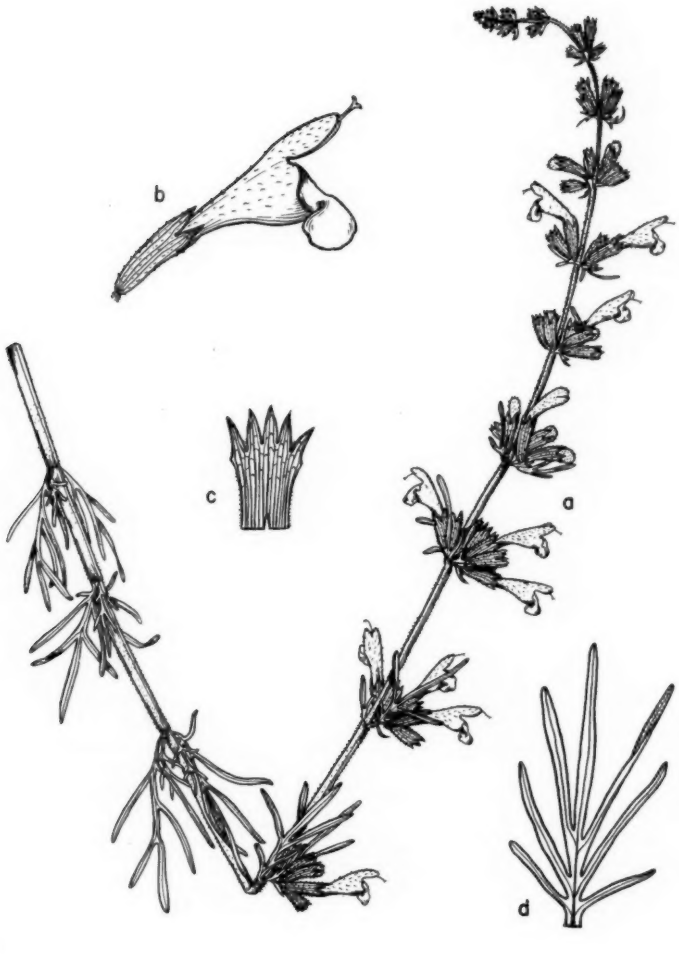


Fig. 9. Dracocephalum tanguticum: a habit, x 1/2; b, flower x 1 1/2; c, calyx expanded x 1 1/2; d, leaf x 1.

and midwest Yunnan. There is the possibility of extensions into India. It has the most broadly northern distribution of the species involved, although D. calophyllum with its northern outriders does overlap in southeast Tibet. No cultivated plants of D. tanguticum have been seen although it is reputed to have been in gardens.

The illustration in DeWolf's paper is not typical of the species. It shows a three-partite and not the more usual five-partite leaf, and the elongated style is not illustrated.

Specimens typical of this species are: N. M. Przewalski s.n. (1880) Kansu (isotype [E]); J. F. Rock 12866, 13260; Farrer 624.

Dracocephalum Hookeri C. B. Clarke ex Hooker f. (Flora of British India 5: 666 [1885]) is based on scrappy material collected in Sikkim by a native collector. The type gathering in the Kew herbarium has been redetermined as D. tanguticum. S. K. Mukerjee in the Edinburgh herbarium has similarly redetermined a distinctive-looking Tibetan gathering of H. M. Stewart's. This gathering, which fits Hooker's description well, is distinctive in possessing a short, dense head of small flowers. One other factor which urges caution in uniting D. Hookeri with D. tanguticum is a plant which this year flowered here. It was raised from seed received from the Royal Horticultural Society's expedition to Nepal under the number Sykes, Stainton, and Williams 8130. This plant does seem distinct from D. tanguticum even though it was first observed long after flowering, when only withered remains from which little could be detected were left.

D. Isabellae Forrest (in Notes from the Royal Botanic Garden, Edinburgh 8: 211 [1911]) is the most handsome and distinctive member of the group. Collected by its author from the Chungtien plateau, it was named after his sister, Miss Isabella Forrest. Several subsequent gatherings from the same area were made by Forrest.

It is distinguished by its large, rich-violet-coloured flowers, its almost digitate, usually seven-partite leaves, and its early-flowering habit - in Edinburgh, June. An excellent illustration of the species is to be found in the Botanical Magazine (t. 8952).

Specimens typical of the species are: Forrest 12789 (holotype [E]), 16596, 30798.

Dracocephalum Forrestii W. W. Smith (in Transactions and Proceedings of the Botanical Society of Edinburgh 27: 90 [1916]) was the first of three species to be separated from D. tanguticum. This separation is discussed in some detail by both author and collector in the above publication. In the original description, six Forrest gatherings are cited but no type is designated. Of these six numbers only three, Forrest 6490, 10978, and 3033, fit the

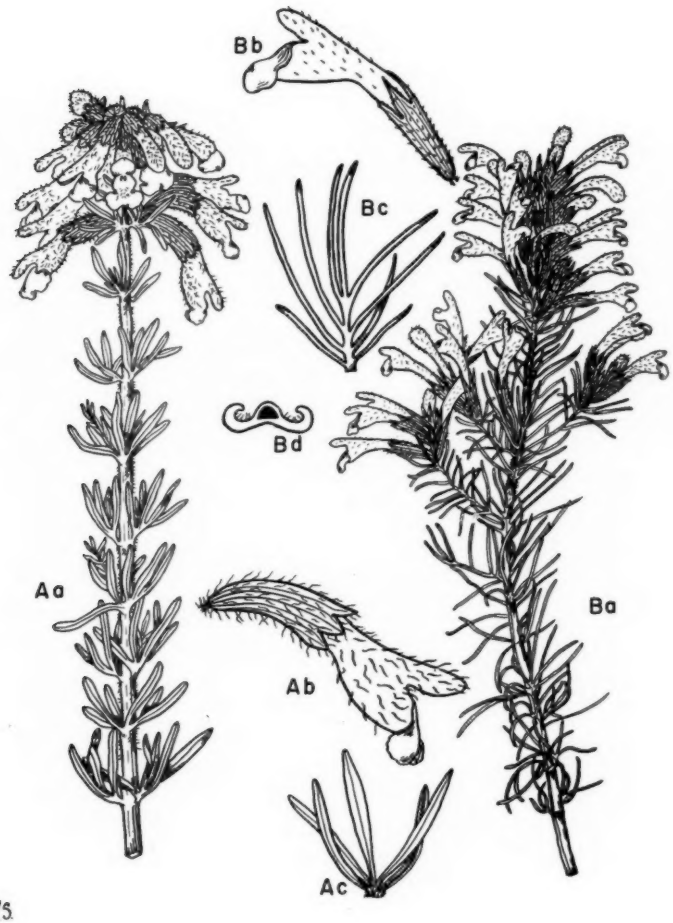


Fig. 10. A, Dracocephalum Isabellae: a, habit x 1/2; b, flower x 1; c, leaf x 1. B, Dracocephalum Forrestii: a, habit x 1/2; b, flower x 1; c, leaf x 1; d, transverse section of leaf x 16.

species. F604 is almost certainly D. tanguticum, while F11297 would be better placed under D. calophyllum. F605, the first number cited, is discussed below under D. calophyllum var. Smithianum.

Dracocephalum Forrestii is particularly distinctive in its foliage which is tightly inrolled, giving a pine-leaved effect. The internodes are very short, scarcely 1 cm. long, and the branches tend to grow erect and not to spread. It has been said to be in cultivation but all plants I have seen under this name have been D. calophyllum var. Smithianum.

Specimens typical of this species are: Forrest 6490, 10978, 16924; J. F. Rock 6134; T. T. Yü 15585.

D. calophyllum Handel-Mazzetti (in Anzeiger, Akademie der Wissenschaften, Wien, Mathematish-naturwissenschaftliche Klasse 1923, 60: 137 [1924]) was collected by its author on the Dokar-La. Here Forrest had also gathered the species and F16815 establishes its extension into southwest Szechuan. It is a sturdier plant than D. Forrestii, differing from that species in its long internodes, broad leaves, and often in its longer-tubed and longer-toothed calyx.

Stapf (in Botanical Magazine 147: t. 8892) gives as differentiating characters between D. calophyllum and D. Forrestii, firstly, the habit of the two plants. Next he mentions a spur-like process of the anthers which he claims as distinctive for D. Forrestii. This is not so, for in varying degree this feature is to be observed throughout both species. Finally, he cites a disjunct distribution, D. Forrestii being confined to the Lichiang Range. This latter remark is perhaps revealing, for in his earlier article on D. Isabellae Stapf gives the home of D. Forrestii as the Chungtien plateau with outriders on the Lichiang. This does indicate that further examination of the material convinced him that F605 from the Chungtien plateau, the first number cited by Wright Smith and with which he would surely equate the cultivated plant he was illustrating, was not D. Forrestii.

This cultivated plant was one of several growing as D. Forrestii at the time of the Wright Smith & Forrest paper. Lantern slides of 1923 illustrate it occupying two south-facing beds at Edinburgh. Presumably obtaining her material from those beds, Miss Snelling prepared a plate in 1920 for Professor Bayley-Balfour. The fate of this plate, the original of which has come to hand, is of some interest.

Volume 147 of the Botanical Magazine having been missed from the series, the late Reginald Cory offered to bear the cost of the publication. To make a selection of material Cory borrowed a number of Miss Snelling's illustrations from Edinburgh. Her painting of this dracocephalum was amongst them and was used by the editor, Dr. Stapf, to illustrate D. calophyllum (Botanical Magazine

147: t. 8892). Correspondence in the Royal Botanic Garden file shows that Stapf, when preparing his earlier article on D. Isabellae, had forwarded for identification a plant growing under that name in Kew. He was informed that it was "aff. Forrestii" [like or related to Forrestii - Ed.]. The following year he encountered this plant again, for it was the one Miss Snelling had painted. Some desultory and inconclusive correspondence followed and it seems obvious that Stapf resolved to treat his plant as distinct from D. Forrestii despite its history.

In 1923 Dr. Handel-Mazzetti had published D. calophyllum. Superficially, the absence both of piney-leaves and of short internodes in this species would make it appear a better home for Stapf's plant than D. Forrestii. There are, however, still differences between the cultivated plant (and F605) and Handel-Mazzetti's species. The former has longer, looser, and woolly inflorescence-hair which, though reminiscent of D. Isabellae, is found in neither D. calophyllum nor D. Forrestii. Furthermore, the calyx-teeth are somewhat shorter and broader than in D. calophyllum while the leaves more often have 7-11 than 5-7 segments. The constancy of hair types within the group as a whole is such as to afford reliable differentiating characters. That the cultivated plant and its wild counterpart F605 should display an unusual association of hair types provides good reason for their separation.

From present knowledge it is not possible to assess accurately the relationship of D. Forrestii and D. calophyllum. Dracocephalum Forrestii, as defined in this note, may prove to be an ecological form occurring in the Lichiang, and union of the two names may be necessary.

Specimens typical of D. calophyllum are: Hand.-Mazz. 8000 (isotype [E]); Rock 24669; Forrest 17258, 20615.

Even more problematical is D. calophyllum var. Smithianum. In view of our limited knowledge of its status in the wild and in the absence of cytological information on it or its allies, it has seemed best to recognize it at varietal rank. Since the plant is nearer to D. calophyllum and since it has been illustrated under this name, it is retained in this species.

Dracocephalum calophyllum var. Smithianum Keenan[1] is named in honour of the late Professor Wright Smith who at one time was actively interested in this group and with whom the problem had been discussed.

[1] D. calophyllum var. Smithianum, var. nov., a var. typica indumento inflorescentiae e pilis longioribus sublanatis composito, segmentis folii saepius 7-11 (nec 5-7) recedit.

Holotype: Forrest 605, Yunnan Chungtien plateau, September 1904. (E)

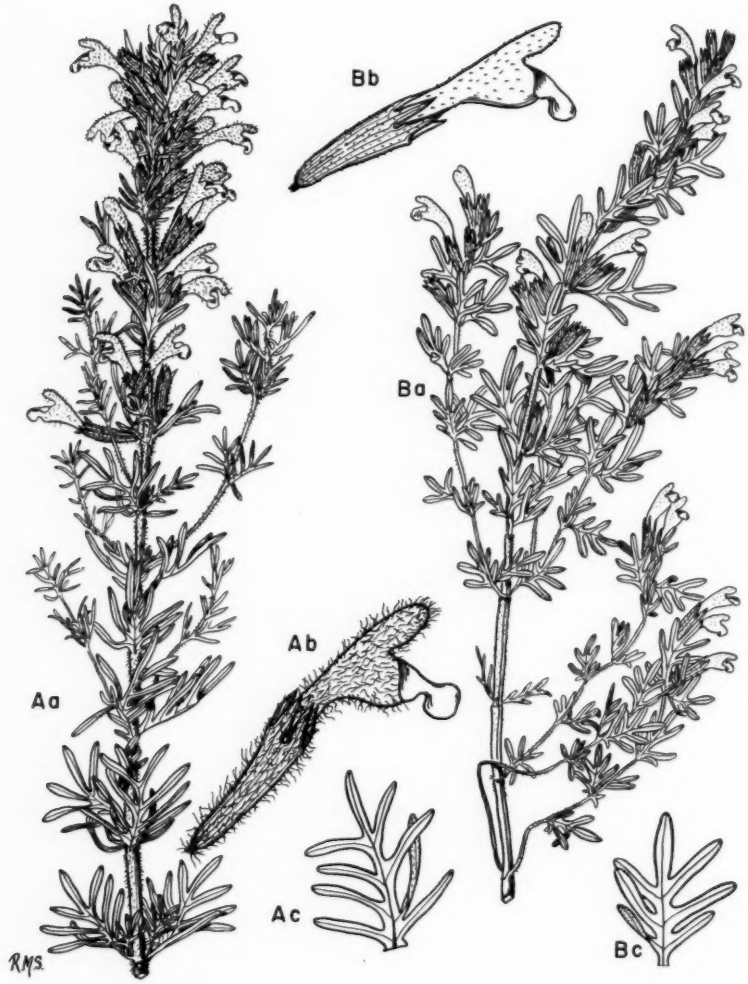


Fig. 11. A, Dracocephalum calophyllum var. Smithianum: a, habit x 1/2; b, flower x 1 1/2; c, leaf x 3/4. B, Dracocephalum calophyllum: a, habit x 1/2; b, flower x 1 1/2; c, leaf x 3/4.

Dracocephalum propinquum W. W. Smith (in Trans. & Proc. Bot. Soc. Edin. 27: 92 [1916]) is distinct from the other species. Smaller in all its parts (the corolla is only 1.4-1.6 cm. long) and much more compact in habit, it was briefly in cultivation in 1910. A cultivated specimen of that time is preserved in the herbarium here. It is now no longer in gardens.

Specimens typical of this species are: Forrest 11195 (holotype [E]), F17084.

Dracocephalum taliense W. W. Smith (in Trans. & Proc. Bot. Soc. Edin. 27: 93 [1916]) is no more than a sex-form of D. tanguticum. It has small flowers and is paler in colour than that species but in all other respects matches well the isotype of D. tanguticum preserved here. It is represented only by the type gathering, Forrest 11524.

Thus, it will be seen that, excepting D. Hookeri, there are five distinct plants of this complex in cultivation. The accompanying key should serve to differentiate these plants.

Key to the species of D. tanguticum complex

1. Leaves almost digitate. . . . . D. Isabellae
1. Leaves markedly pinnatifid.
   2. Internodes short, less than 1 cm. long; leaves tightly inrolled. . . . . D. Forrestii
   2. Internodes long, more than 2 cm. long; leaves flat, not inrolled.
      3. Style exserted; calyx less than 1.4 cm. long. . . . . D. tanguticum
      3. Style not exserted; calyx more than 1.7 cm. long.
         4. Inflorescence-hair short, not woolly; leaves more often with 5-7 segments. . . . . D. calophyllum
         4. Inflorescence-hair long and woolly; leaves more often with 7-11 segments. . . . . D. calophyllum var. Smithianum

The Dracocephalum grandiflorum alliance

Plants of this alliance variously determined as D. grandiflorum, D. rupestre, and D. imberbe were raised in this garden. The seed was received, respectively, from the Botanic Gardens of Kew in 1947, Stockholm in 1933, and Salle, Germany, in 1951. These plants were obviously conspecific and investigation showed their correct name to be D. rupestre Hance. A consideration of this problem involved the examination of other species in this alliance. These were D. Wallichii, D. bullatum, D. Purdomii, D. Rockii, and their synonyms. The results are stated here and a key is provided to differentiate the plants said to be in cultivation.

Dracocephalum grandiflorum Linnaeus is represented in the Linnaean herbarium by three specimens. From the first of these, Linnaean Herbarium No. 746/8, Linnaeus obviously drew his description. This specimen is atypical in its smaller flowers and in

its entire, not toothed bracts. The other two, No. 746/9 Hort. Uppsala and No. 746/10, have toothed bracts and larger flowers. The first number, although an aberrant form, is certainly conspecific with the other two. Therefore, there is no support for Laxmeyer's name D. altaiense (Acta Horti Petropolitani 5: 556 [1770]) proposed for the more typical large-flowered form with toothed bracts. Various workers, probably misguided by the Linnaean description of D. grandiflorum as an entire-bracted annual, have maintained this separation. The illustrations in Botanical Magazine (t. 1009), Botanical Register, Sweet's British Flower Garden, Loddiges' Botanical Cabinet, etc., are all of one species, the correct name for which is D. grandiflorum Linnaeus.

Dracocephalum grandiflorum is not known to be in cultivation in this country at present. Loddiges writes (Loddiges' Botanical Cabinet No. 190) that his first introduction in 1786 dwindled out but that he reintroduced it in 1810. A reintroduction now would be of some worth, for the plant is a handsome one. It has large hooded corollas of an intense dark blue and the lower lip is marked with darker spots. It is small in stature, if one is to judge from wild material which grows to only 15-30 cm. high. The basal leaves are narrowly cordate and shortly petiolate while the stem leaves are sessile.

Dracocephalum grandiflorum has been recorded in the wild from Siberia and from the Altai mountains. Plants seen in cultivation under this name have all been D. rupestre.

Dracocephalum imberbe Bunge (Verzeichniss..., Ein Supplement zur Flora Altaica, 50 [1836]), according to literature, shares the Altai mountains with D. grandiflorum. However, all herbarium material of this species seen in the Edinburgh herbarium has been from the Tian Shan area of Turkestan.

No cultivated material has been seen, but in the wild it is a lax-growing perennial herb up to 35 cm. high. The leaves are broadly cordate, deeply crenate, the uppermost shortly petioled, the basal leaves with petioles up to 12 cm. long. The corolla-tube is exserted to at least the calyx length before pouching. It is pale blue in colour and is not hooded. Plants seen under this name in gardens have been D. rupestre.

Dracocephalum rupestre Hance (in Journal of Botany, London 7: 106 [1869]) is a small perennial herb forming dense clumps of sparsely hairy leaves with petioles up to 8 cm. long. The flowering stems ascend to 35 cm., becoming decumbent in age, and bear short, oval, dense, asperous, spiciform inflorescences. Occasionally axillary inflorescences are borne on strong shoots. The reddish calyx has spinose teeth and is half the length of the corolla, which is dark bluish violet, 3.5-5 cm. long, with a narrow tube abruptly pouched beyond the calyx.

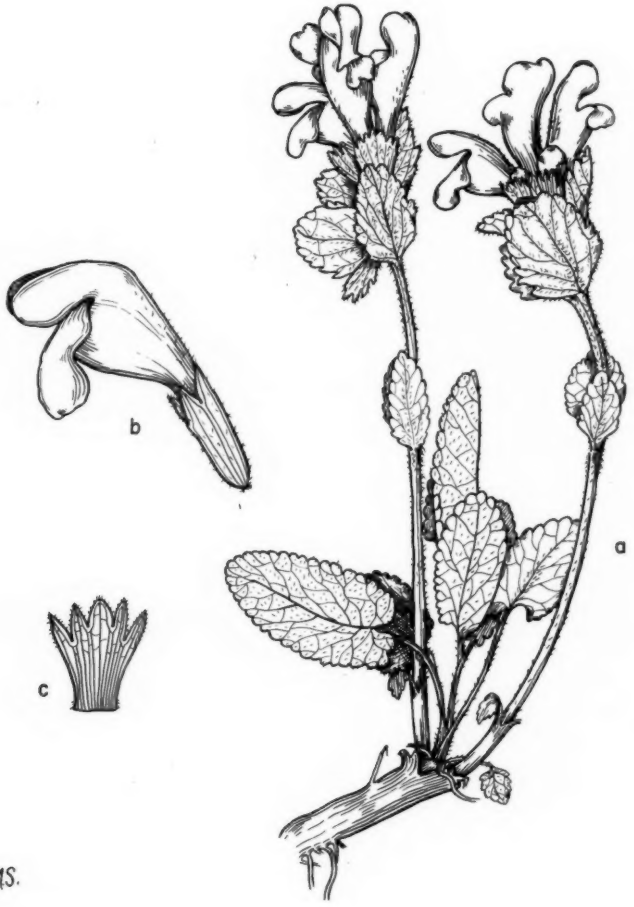


Fig. 12. Dracocephalum grandiflorum: a, habit; b, flower x 1; c, calyx expanded x 1.

The origin of the plant in cultivation is unknown, but it has reached the Garden here from various seed sources. The plantings raised have been remarkably uniform and are homogeneous with a few wild gatherings from the Chili and Shansi provinces of China.

One of these gatherings had been designated D. rupestre by Hance in 1869 (Hance Herb. 14881). This had been collected from the mountains of the Miao feng Shan at about 2000 metres. From this locality it was again collected by Carles in 1885 and its range is extended into the adjoining province of Shansi by collections of M. S. Clemens, Wang, and others.

In his key to the Labiatae of China (Notes Roy. Bot. Gard. Edin. 6 [1915]) Dunn united D. rupestre with D. grandiflorum. In this he has been followed by all subsequent authors, including Kudo in his "Labiatarum Sino-Japonicarum Prodromus." There exist no valid grounds whatsoever for the union of these two so dissimilar species.

Recently two specimens from dracocephalum plants cultivated in the "Cantonspark" Botanic Garden, Utrecht, arrived here for identification. The correspondent writes, "The seeds reached us from the Botanical Garden at Linz (Austria) under the name D. grandiflorum. Five of the plants that grew from these seeds were planted in the Garden of which four had dark-blue and one had very light-blue flowers." One specimen of each was sent to Edinburgh and the dark-blue-flowered one was undoubtedly typical D. rupestre. The light-blue-flowered specimen is most probably a sex-form. It is smaller in all its parts than typical D. rupestre. The anthers are very small but well formed although no trace of pollen was found. It would be satisfying to have the plant under observation but no seed ripened on any of the "Cantonspark" plants last year although it is hoped to obtain seed from them this year.

Dracocephalum Purdomii W. W. Smith (in Notes Roy. Bot. Gard. Edin. 9: 205 [1916]) is a perennial herb, smaller and less leafy than the preceding species. The stem leaves are short-petioled while the basal ones have petioles up to 4 cm. long. The flowering stems elongate to 20 cm. and bear compact asperous inflorescences the calyces of which are not masked by leafy bracts. The corolla, 2.2-2.5 cm. long, is less than twice the length of the calyx. It is bluish violet in colour with numerous purple blotches on the lower lobes.

This species was detected by Farrer and Purdom during their Kansu expedition of 1914. The type specimen, Farrer & Purdom 180, was taken from the Min San region of Kansu. From Choni, on the banks of the River Tao, a slightly more northerly station, it has been collected again by Rock (12871). These two gatherings represent our knowledge of the species in Edinburgh, for no culti-

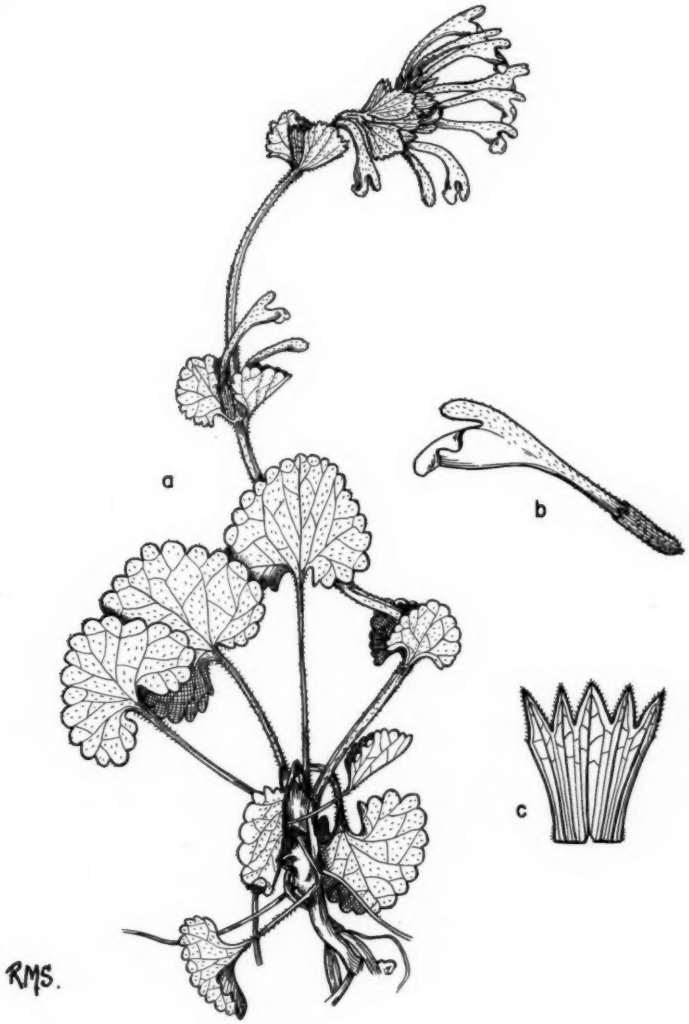


Fig. 13. Dracocephalum imberbe: a, habit x 1/2; b, flower x 1; c, calyx expanded x 2.

vated records have been seen. Mention is made in the Gardeners' Chronicle (96: 262 [Oct. 1934]) of its being in cultivation, and certainly the description there given could be D. Purdomii.

There is a very close relationship between D. Purdomii and D. rupestre, both in distribution and morphology. However, the distinctions between the two are at the moment sufficient to justify their separation. Kudo makes the new combination D. grandiflorum var. Purdomii (W. W. Smith) Kudo, but this obviously is inaccurate. It is felt that, rather than propose its transfer at varietal rank to D. rupestre, the happier solution is to reinstate its specific rank.

Dracocephalum Wallichii Sealy (in Botanical Magazine sub t. 9567) is a lax-growing herbaceous perennial with flowering stems 40-60 cm. high. The basal leaves are borne erect on petioles up to 30 cm. high; the stem leaves are only shortly petioled. The stems, petioles, and leaf-veins are generally green and all parts are more or less hairy. Calyces are half or more the length of the bluish-violet corolla. The corolla has dark-purple spots on the lower lip, and pouches abruptly beyond the calyx.

This is a well-known plant in gardens and was first introduced about 1875 from Sikkim through seed received from H. J. Elwes. Recently it has been reintroduced from Nepal through seed of a Sykes, Stainton, & Williams expedition. Both introductions are substantially very similar.

Dracocephalum Wallichii was first discovered by Wallich's collectors in Nepal and the natural distribution has since been extended by collections from Sikkim, Bhutan, Lahul, and Tibet. Bentham designated Wallich's specimen D. speciosum but Sealy (in Botanical Magazine sub t. 9567) gives cogent reason for discarding that name for this plant and substitutes its present name.

Dracocephalum Wallichii is well illustrated in the Botanical Magazine (t. 6281).

Dracocephalum bullatum Forrest ex Diels (in Notes Roy. Bot. Gard. Edin. 4: 238 [1912]) is a sturdy perennial herb with flowering stems elongating to about 25 cm. The stem leaves are short-petioled, the basal leaves have petioles up to 10 cm. Stems, petioles, and leaf undersurfaces are strongly coloured purplish red. The inflorescences are stout, not asperous, and in dried material are masked with purplish leafy bracts. The bluish-violet corolla is 3-3.5 cm. long and has dark-purple blotches in the lower lobes. The corolla abruptly pouches beyond the calyx, which is half or more the corolla length.

This plant is closely akin to the previous species if not actually conspecific with it. Dunn, in his key to the Labiatae of China, united the two and in this was followed by Dr. Handel-Mazzetti and Professor Kudo. Sealy, however, when discussing the plant (Bo-

Fig. 14. Dracocephalum rupestre: a, habit x 1/2; b, flower x 1; c, calyx expanded x 1.

tanical Magazine t. 9657), gave several reasons for his reinstating it to species rank. An examination of more material than was available to these workers leaves the impression that reunion of the two may sometime be necessary. In this event D. bullatum would become the specific name. However, this need not be undertaken here, for, although evidence points towards this conclusion, much more must be known of the sexual behaviour and variation of the plants of this alliance in the wild before the group is understood.

Dracocephalum bullatum was first located by Forrest on the Lichiang Range in Yunnan in 1906 and was subsequently described from his gathering F2730. Forrest re-collected it from this locality on subsequent occasions and from here it has been gathered also by Rock and T. T. Yü. This Lichiang plant is quite distinct from the cultivated D. Wallichii. However, the two appear to be linked by a series of intermediates.

When reinstating this plant (D. bullatum) at species rank, Sealy gave as his main reasons for separating the two the size of the Himalayan plant, the absence of red colouring on stem, petioles, and leaves, and the disjunct distribution of the two species as then known. Several other minor characters served to aid his separation. In the main, these other characters - degree of hairiness, size of corolla and calyx, and size relationship of parts - tend to be too variable throughout the species range to be of separating value.

The distribution is by no means as disjunct as first appeared. Collections by Cooper and by Ludlow, Sherriff, & Hicks extend the Himalayan plant's range into Bhutan. A gathering by Bor comes from Rotang in the Lahul area of the Punjab. From Lukuthang Mago in southeast Tibet, Ludlow & Sherriff 810 has been collected. All these gatherings are identical with the cultivated D. Wallichii.

From farther east in the area of the Tsangpo-Salween divide, Kingdon Ward has made a collection (K. W. 10891) which provides a direct link with D. bullatum. It is a small depauperate form occurring at 16,000-17,000 ft. north of Shugden Gompa. It is referable to D. Wallichii and, in fact, apart from the reddish colouring on petioles and leaves, is identical with an early Hooker gathering from Sikkim. It is almost identical with gatherings from Muli which had been tentatively regarded as representing a more easternly dwarf form of D. bullatum with smaller parts. A casual examination of these Szechuan gatherings might suggest D. Purdomii. However, amongst other things they differ from that species in their soft, not asperous, inflorescences and in their calyces' being masked by leafy bracts and not distinct as are those of D. Purdomii.

Thus, it will be seen that the distribution of both species has by later gatherings been made much less disjunct. The presence of similar depauperate dwarf forms in both species-ranges further

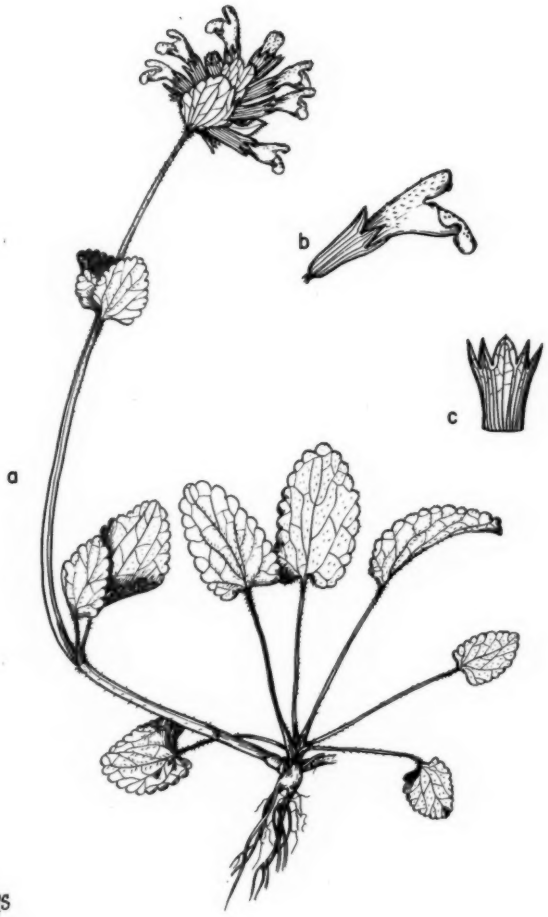


Fig. 15. Dracocephalum Purdomii: a, habit x 3/4; b, flower x 1; c, calyx expanded x 1

accentuates a close relationship. The pronounced reddish colouring is present in a gathering of D. Wallichii from the Tsangpo-Salween divide, midway between the two species ranges.

Typical material of D. bullatum Forrest, represented in the Edinburgh herbarium, includes: Lichiang Range, Forrest 2730 (type), 6214, 27849, T. T. Yü 15418, J. Rock 5258, 24915; Tali Range, Forrest 28128; Yung-Ning, McLaren N. 151.

Typical material of Szechuan gatherings which have been referred to D. bullatum but which differ from this species in their dwarfer habit, shorter calyx and corolla, and in their shorter and narrower posterior calyx-tooth includes: Muli, Kingdon Ward 4631, Rock 18309, 24001, 24529; Mount Konke, Rock 16849; Sungpan-hsien, Fang 4105.

The gathering Handel-Mazetti 175 from Yung-Ning, whilst having the broad posterior calyx-tooth of typical D. bullatum, has yet the smaller calyx and corolla of the Szechuan plant. The truncate posterior calyx-tooth as illustrated in Botanical Magazine t. 9657 is not evident in the type nor in other material examined here.

Dracocephalum bullatum Forrest as represented in cultivation is illustrated on t. 9657 of the Botanical Magazine.

Dracocephalum Rockii Diels needs only a few words here. It has never been in cultivation. Diels differentiates it from its close ally D. bullatum principally by its stoloniferous habit and hairier foliage. It will need close examination and comparison with D. bullatum in any critical work on the group. Since it was the last of the alliance to be described, any change in status need not upset the nomenclature of the cultivated plants.

There remains the problem of the true identity of the plant masquerading in gardens as D. Mairei.

The true D. Mairei Léveillé (in Fedde, Repertorium 13: 343 [1914]) is a blue-flowered, nettle-leaved species named in honour of E. E. Maire, the French missionary, who gathered the type specimen in Yunnan. Dracocephalum Mairei Léveillé has never been in cultivation. In 1930 Emberger (in Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord 21: 113) repeated this name when describing a Moroccan gathering, wishing to honour the French botanist R. Maire. Emberger rectified this a few years later by proposing D. Renatii Emberger (in Bulletin de la Société des Sciences Naturelles du Maroc 15: 214 [1935]) and D. Renatii Emberger is the correct name for the plant in cultivation under the name D. Mairei. There was therefore no necessity for the coining of the name D. atlanticum Boom (in Acta Botanica Neerlandica 4: 171 [1955]), which must be regarded as superfluous. This Moroccan plant represents an interesting extension in range of the genus

Fig. 16. Dracocephalum Renatii: a, habit x 3/4; b, flower x 1 1/2; c, calyx expanded x 1 1/2; d, leaf x 2.

Dracocephalum to Africa. Its affinity is with D. setigerum Boissier & Huet, a species represented in Edinburgh by only one gathering, that of H. H. Calvert & J. Zohrab from Armenia in May 1867.

Distribution apart, it is unusual in its creamy-white flowers. It is entire-leaved and the whole plant is densely hairy with a resultant greyish colour effect. It is fairly happy in the Edinburgh rock garden in a sunny, well-drained position. An illustration of the species is provided here.

Key to the species of the D. grandiflorum alliance

1. Inflorescence asperous; calyx-teeth spinose.
   2. Corolla 2.5 cm. long; basal leaves narrowly cordate, 2 cm. broad. . . . . D. Purdomii
   2. Corolla 3.5-5 cm. long; basal leaves broadly cordate, 4-5 cm. broad. . . . . D. rupestre
1. Inflorescence soft, not asperous; calyx-teeth not spinose.
   3. Corolla-tube much exserted from calyx before pouching; flowers pale blue. . . . . D. imberbe
   3. Corolla-tube pouching abruptly from calyx; flowers generally dark blue.
      4. Basal leaves narrowly cordate, up to 3 cm. broad; corolla conspicuously hooded. . . . . D. grandiflorum
      4. Basal leaves broadly cordate, more than 4 cm. broad; corolla not conspicuously hooded.
         5. Plant up to 60 cm. high; stems, petioles, and leaf-veins greenish, not purplish. . . . . D. Wallichii
         5. Plant up to 30 cm. high; stems, petioles, and leaf-veins purplish. . . . . D. bullatum

ADDITIONAL SOURCES OF ROCK GARDEN PLANTS

To the list of American sources of rock garden plants published in Baileya 4: 128 (September, 1956) should be added:

Alpine Nursery (Ray Williams), 108 Meidl Ave., Watsonville, Calif.
La Rochette Nursery (Victor Reiter, Jr.), 1195 Stanyan St., San Francisco, Calif.

The address of the Mayfair Nurseries (Walter Kolaga) should also be corrected to R. D. 2, Nichols, N.Y., their new mailing address.

Plantsmen in Profile, I: Edward C. Robbins, Rex D. Pearce, Edwin A. Menninger

Mary H. Moon

It is the labors of centuries of men - plant explorers, missionaries, botanical collectors, and others, some of them forgotten and unsung - that have provided the beauty and diversity of the many plants in our gardens today. We recall names like von Humboldt, Fortune, Forrest, Farrer, von Siebold, Fairchild, and E. H. Wilson - a small sampling of the great plant collectors. We also remember equally important men like Clifford, Linnaeus, Veitch, de Vilmorin, and Verschaffelt who sponsored plant exploration.

Even today men are adding to the variety and quality of the plants we may choose to grace our gardens, though often we do not recognize their services, perhaps because the glamor of plant exploring in foreign lands of earlier days is not associated with them.

In the United States men such as English, Houdyshel, Johnson, Menninger, Park, Pearce, Robbins, Rose, and Vick - to mention a few - are insuring continued interest and variety in American gardens through their introductions of new, rare, and unusual plants. Their achievements deserve recognition. In another century they will be remembered as outstanding plantsmen and benefactors of our gardens. It is appropriate, therefore, to record their work now, so that today's horticulturists may be better acquainted with these men as personalities, and may have a contemporary record of their contributions.

It is difficult to generalize about these plant introducers. Some have been plant lovers from youth, others became interested in plants later in life. For most of them, plants have been a source of livelihood, but for others plants are primarily a self-supporting

[1] This is the first of a projected series of articles about contemporary American plantsmen and their contributions to our inventory of cultivated plants. Background information has been obtained through correspondence, interviews, and studies of published catalogues. Though the subject of each sketch has read and approved the final draft, the author assumes full responsibility for the material presented.

hobby. Perhaps the most valid generalization is that these men have in common a love for plants that stimulates them to study, grow, and experiment with them and to contribute to the pleasure of others by distributing seed, bulbs, and growing plants.

Edward C. Robbins

Mr. Edward C. Robbins maintains the headquarters of his "Gardens of the Blue Ridge" at Ashford and his nursery at Pineola, in the Blue Ridge Mountains of northwestern North Carolina. His firm is well known to those who love the native flora of that state and who endeavor to grow representatives of that flora in their own gardens. Since 1920 he has provided gardeners with more kinds of common and rare plants of the North Carolina mountains than perhaps has any other single grower.

Mr. Robbins - now in his seventy-ninth year - has been involved in nursery work since he was fourteen, when he took his first job with Harlan P. Kelsey, working at Kelsey's "Highlands Garden," at that time in Pineola, and Linville, North Carolina. This establishment, long since discontinued, was probably the first nursery to deal exclusively with the native flora of the North Carolina mountains. Kelsey was responsible for introducing to cultivation many of the rare and unusual mountainside plants of this area and Mr. Robbins' work under him was to grow these native ornamentals.

As a mountain boy Mr. Robbins knew the woodland flora and where its members could be found, for native plants had always been his hobby. It was while working for Kelsey that he became so interested in the ornamental value of these native plants that, when "Highlands Garden" was transferred to Massachusetts, he took the step to establish his own nursery as the leading commercial source of native plants of the area. We owe to Mr. E. C. Robbins, therefore, the continuing availability of a broad variety of native North Carolina mountain plants.

In 1921 he issued his first price-list, offering 56 species and varieties, in 37 genera. These plants had been propagated in his nursery from stock collected in the wild. This practice assured the purchaser of better quality plants, on better root systems, than he would have received if stock had come directly from collections in the wild. To further ensure plants of good quality, Mr. Robbins offered only stock grown out-of-doors for at least one season. He reports in his catalogue that these plants seldom suffer winter-injury, although temperatures may fall below zero Fahrenheit. For many years now he has offered about 250 species of native

Fig. 17. Edward C. Robbins.

shrubs, trees, and herbs, raising some 35,000 plants annually to provide material to the 12,000 or so gardeners and plantsmen who seek them.

Those who appreciate the beauty of the flora of the North Carolina mountains owe a great deal to Mr. Robbins for continuing to make available several kinds of exceptionally fine plants. His purpose has been to offer plants of outstanding horticultural merit, without being concerned as to whether he is the only supplier. Hence, he, himself, expects no credit for having introduced new kinds of plants to our gardens. Nevertheless, study of the Hortorium's records of plants in cultivation and their commercial sources indicates that we owe him our thanks for being the only current source of native mountain plants such as the Trailing Monkshood (Aconitum reclinatum), Bunchflower (Melanthium virginicum), and Saxifraga Michauxii.

A few sources offer various other plants featured by Robbins but none has so large an inventory of the rarer sorts nor so complete a list of native ferns, lilies, and orchids, from this area. A sampling of other rare items in his current catalogue (some of which are also available from other dealers) includes:

Aconitum uncinatum (Clambering Monkshood)
Amianthium Muscaetoxicum (Fly-poison)
Aplectrum hyemale (Putty-root)
Castanea pumila (Chinquapin)
Chamaelirium luteum (Blazing-star)
Diphylleia cymosa (Umbrella-leaf)
Disporum lanuginosum (Fairy Bells)
Heuchera villosa (Hairy Alumroot)
Houstonia serpyllifolia (Creeping Bluets)
Hydrastis canadensis (Golden-seal)
Hypericum Buckleyi (Mountain St. Johnswort)
Lilium carolinianum (Carolina Lily)
Lilium Grayi (Gray's Lily)
Lygodium palmatum (Climbing-fern)
Magnolia Fraseri (Ear-leaved Umbrella-tree)
Rhododendron canadensis (Rhodora)
Sarracenia flava (Yellow Pitcherplant)
Shortia galacifolia (Oconee-bells)
Stenanthium robustum (Feather Flower)
Trillium luteum (Yellow Trillium)
Trillium sessile (Toad Trillium)
Woodwardia virginica (Chain-fern)
Xerophyllum asphodeloides (Turkey-beard)

Although native North Carolina plants are his specialty, Mr. Robbins offers a few American natives from outside this region and also a few select species from abroad.

His nursery has always been the center of his interest, for as he says, "There is enough in my line to take all my time." Perhaps this devotion to his nursery and to the plants he has loved for so many years explains in part the growth of his trade, despite setbacks during the depression years of the 1930's. Certainly another contributing factor is his concern that his nursery plants be of top quality.

But there is more to Mr. Robbins' success than this. In many respects he is a self-made man. His education, like that of many other Americans born in the late 1800's, came from experience rather than from book-learning. The early county schools provided him with the only formal education he has had, eleven months in all, he tells us: a few months each winter until he was fourteen. By reading widely and studying nature, he has acquired an extensive knowledge of plants and their habits and a good understanding of their botany. Over the past half-century he has built up a fine working library of horticultural and botanical works which has helped him in writing his own catalogues and in checking the accuracy of the names and descriptions of his offerings. He is modest about these accomplishments in self-education, just as he is modest about his contributions to American gardening.

Most of Mr. Robbins' life has been spent in an area with a radius of about fifteen miles. He was born January 6, 1878, at Patterson, North Carolina, a community in the same hills he has roamed for so many decades in search of plants worthy of a place in our gardens. His birthplace, and his present home at Pineola, are twenty-five miles apart. Despite this provincial background, Mr. Edward C. Robbins is known as an acute plantsman in America and abroad, wherever his native plants can be grown.

Rex D. Pearce

The well-thumbed pages of the multicolored catalogues of perennial and annual flowers are ample proof of the pleasure plantsmen find in growing the standard sorts. Yet, the most enthusiastic gardener sooner or later finds that even the great assortment of annuals and perennials in the ordinary listings is not varied enough to suit his tastes. As he becomes more discriminating, he must have the rare, the unusual, and the little-grown kinds of plants that will test his skill as a gardener and add special interest to his beds of old favorites. It is not long before his quest for them brings him to the catalogue of Rex D. Pearce, a name synonymous in this country with rare plants, seeds, and bulbs.

Rex Pearce has been interested in plants from the time he was old enough to have a garden corner for himself on his father's farm at Janesville, Wisconsin. He started by growing the more usual kinds, but to these gradually added native plants which he collected himself, taking notes on their growth in his garden. He recalls that one year while he was still in school he flowered over two hundred horticultural varieties of sweet pea and made notes on them. Another year he would concentrate on a different group of plants.

By 1910, when he was 19, he published his first list of seeds for sale, a small one, of the more usual kinds, most of which he

had grown himself. This was in northern Idaho, where he had gone for his health the year before, and where he spent the following three years teaching school. During the summer of 1913 he returned to Wisconsin to marry Cornelia Boyden. They bought an Idaho ranch and started a small seed-growing business while he continued teaching for another year. He then decided to complete the teacher training course he had started in 1907 before becoming ill, graduating from Wisconsin State Normal School (now Wisconsin State College) in 1915. It was during this period that his interest in the more rare and unusual plants developed.

About 1920 he returned to Wisconsin, and for a few years worked with the L. L. Olds Seed Company at Madison. Then, in 1923, he started a nursery in partnership with Lewis Hansen, a former county agricultural agent. They had planned and saved money for the venture during the preceding three years, but realized during their first year in business that the nursery was too small to support two families. Therefore, when Mr. Pearce was offered a job in the seed department of the Henry A. Dreer Company of Philadelphia, in 1923, he sold out his interest to Hansen and moved east. Mr. Hansen continued the nursery for many years, offering standard kinds of woody and herbaceous material.

As soon as his workday at Dreer's was over, Mr. Pearce would work in his own garden at his Merchantville, New Jersey, home, and in the rented gardens in which he had planted his beloved rare and unusual perennials and bulbs. He finally bought a field for additional plants at Moorestown, about five miles from his home. As his gardens developed, he acquired from foreign collectors seeds of many species never before known to have been grown in any American garden. Soon his free time became all too short to accomplish the work demanded in his gardens, even with the constant help of Mrs. Pearce, who shared his love for plants. He then approached Dreer's with an offer to sell under that firm's name seeds he saved from his rare plants. Dreer's agreed, and Mr. Pearce prepared a special catalogue of these seeds for them. At the same time an agreement was reached which allowed him to sell under his own name seeds of his production that Dreer's did not stock. This was the opening wedge to his own business.

"By January, 1933," Mr. Pearce tells us, "the volume of my business had increased to the point where it became evident that I would either have to give full time to it, or drop it altogether. Mrs. Pearce had worked with me throughout, so we talked the situation over. We decided to take the chance and to devote all our time to our own seed and nursery business." This was a major decision to be made during the depths of a great depression, for it meant leaving a salaried job when he had a family to support. At the close

Fig. 18. Rex D. Pearce.

of that year he left Dreer's, but continued for several years to produce on contract for them seeds of many less common kinds of plants.

The Moorestown acreage, at first operated from Merchantville, was called Old Orchard. During the Second World War the plantings covered thirty-two acres, for Pearce was contract-growing material that European firms had supplied American dealers before the war. When European competition returned after the war, he decreased his acreage, grew the higher-value items, and contracted with dependable sources for the more usual kinds. Today, the intensively cultivated areas of the Pearce Seed Company occupy ten acres, with an administration building providing seed and storage spaces, and greenhouses, on the premises. These facilities handle over 3,000 species of seed- and bulb-propagated perennials and annuals each year. In some years as many as 4,000 kinds are grown, including special strains and hybrids.

The nursery has always been a family business. The Pearces' daughter, Margaret, who inherited her parents' love of plants, studied at the School of Horticulture for Women at Ambler, Pennsylvania (now the American School of Horticulture). After graduation she majored in horticulture at Cornell University, and as soon as she received her degree in 1939, started to learn the family business from the seed-bed to the outgoing-order department. A year earlier it had required but little persuasion on her part to convince her father that Oliver J. Stark, also a horticulture major at Cornell, should join the nursery, and in 1940 she and Mr. Stark were married. The Starks recently have bought the firm, which they operate as the Pearce Seed Company.

Mr. Pearce's recent retirement from the firm has not diminished his activity in behalf of the gardener who seeks new plants. Today he maintains a two-acre garden at his Hendersonville, North Carolina, home where he grows and studies rare and unusual perennials and bulbs. He still prepares the advertising for the seed company, and continues to write all the copy for the catalogues. Mr. Pearce speaks for the family when he says, "We have specialized in the less usual items because, first of all, we were much interested in them ourselves. Secondly, we thought we were rendering some service to gardening by helping to increase the extent of available plant material."

Unquestionably, plantsmen owe much to this man for the increase in the number of kinds of rare and unusual plants available to them. These plants have come from every continent, for over the years he has maintained contacts with botanic gardens, private collectors, and owners of private gardens as sources of seeds, bulbs, and plants that might merit a place in our gardens. The greatest proportion of these introductions have come from Europe,

Asia, and North America. Many are the result of careful search among the little-known beauties of our own continent. Over the years Rex Pearce has made numberless plant collecting trips through the East Coast States, from the Adirondacks to the Blue Ridge Mountains and southward into Florida. Seed has been collected of rarities from New Jersey's famed pine barrens; plants of this region have become available in quantity from Old Orchard Nursery.

From among hundreds of plants that might rank among his most important introductions, Mr. Pearce considers these to be outstanding:

Acidanthera Murieliae
Artemisia Schmidtiana 'Silver Mound'
Cleome lutea
Cleome speciosissima
Cooperia Smallii (Zephyranthes Smallii)
Dicentra formosa 'Alba' (Dicentra 'Sweetheart')
Eustylis purpurea (Iris family)
Herbertia pulchella (Amaryllis family)
Gypsophila Oldhamiana
Hibiscus paramutabilis
Machaeranthera tanacetifolia (Tahoka Daisy)
Mirabilis uniflora
Ornithogalum Saundersiae
Salvia microphylla
Scabiosa Fischeri
Sclerocarpus major
Veronica holophylla
Weldenia candida (Spiderwort family)
Welwitschia mirabilis
Worsleya procera (Amaryllis family)
Zephyranthes pulchella

Seed procured from botanic gardens is used only for propagation and is never resold. Each kind received is grown at Old Orchard to determine its ornamental value, and only those considered to have horticultural merit are grown in quantity for sale. At least two-thirds to three-fourths of all the plants, seeds, and bulbs offered, excluding "Holland" bulbs, are grown at Moorestown. The rest are purchased for direct sale from commercial growers here and abroad, from private gardens, and from collectors of native material.

Mr. Pearce is also a plant breeder and has introduced several hybrid strains of his own origination. A small sampling of these includes:

Hibiscus 'Avalon Hybrids' (H. militaris × H. coccineus)
Hibiscus 'Avalon Red' (a clone selected from 'Avalon Hybrids')
Silene 'Avalon Hybrids' (S. caroliniana var. Wherryi X S. virginica)
Cuphea 'Avalon Hybrids' (the product of extensive crossings among C. Llavea miniata, C. procumbens, C. cyanea, and C. viscosa)
Baptisia 'Old Orchard Hybrids' (B. australis minor × B. villosa)
Belamacanda 'Avalon Hybrids' (B. chinensis × B. flabellata)
Penstemon 'Avalon Hybrids' (P. Murrayanus × P. grandiflorus)
Anchusa 'Avalon Hybrids' (A. affinis × A. ochroleuca × A. officinalis incarnata)
Viola 'Avalon Hybrids' (V. saxatilis × V. aetolica)

Mr. Pearce has carefully followed the changes in gardening interests over the years and has taken account of them in planning his nursery plantings. In response to a shift in gardeners' demands for plants rather than seeds he began in 1943 to produce an increasing number of plants for sale. Today the nursery section approximately equals the seed-production section in acreage and value. Mr. Pearce believes this increasing demand for plants is correlated with the general economic situation: in these better times people are prone to look for immediate results from their purchases, hence money is spent for plants rather than seeds. Often these plants are showy kinds, with big blossoms and bright colors. In contrast, during the depression years gardeners stretched their funds by purchasing seeds, particularly those of less gaudy, smaller plants such as primulas and gentians. He notes that home gardening provided an escape for these persons from their economic disappointments during that period: everything seemed better when they worked in the garden.

According to Mr. Pearce, gardening interests continue to show an interesting transition. Since 1955 gardeners have been buying proportionately fewer rare and unusual plants than in the recent past. One factor accounting for this, he tells us, is that the younger generation does not realize the great range of garden material that exists. There are few advanced gardeners in any one area to tell others about the kinds of unusual plants, and this restricts the number they learn about. Moreover, a great deal of time and loving care is needed to grow many of the less common kinds - and we are in a period when serious gardening has less appeal than other forms of recreation.

It is the advanced gardeners, largely amateurs, that comprise a large portion of the nursery's retail trade. From correspondence and talks with his customers, Mr. Pearce considers them to be mostly beyond middle-age, to have slightly higher than average incomes, and to include more college graduates than do the patrons of the larger mail-order catalogue houses.

One may well hazard the guess that many of the 72,000 persons who annually receive the Pearce catalogue find as much pleasure and enjoyment in reading his comments in it as in studying the plant lists. Each issue has a charm rare among catalogues, a charm that comes from the personality of Rex Pearce. His comments on plant histories and names, his occasional notes about his nursery work, and his homespun philosophy are engagingly written. Intermittently, among descriptions and cultural information about plants, boxed comments like these are found:

> Feeling is not thought, but too often mistaken for it.
>
> Of those who work with their head, trust first the one who likes also to work with his hands.

> Youth believes Time is surfeit, so procrastinates. Maturity knows Time's swift pace, so hastens deeds. Age knows Time is nearly done, so savors it slowly.
>
> The price of anything is not what it takes from our pocketbooks, but what it takes from our lives.
>
> Through strict conformity there can be no progress. When occasion warrants, be not afraid of breaking the pattern; but do not break simply to become known as a breaker. There is scant virtue (horticultural or political) in that.
>
> A sure way to go nowhere is to spend all time getting ready to go somewhere.
>
> There is too much to know about gardens, and the plants that may go into their making, for anyone to get very far into the knowing of it in just a single lifetime.
>
> Friendly argument is the whetstone of the agile mind.

Even portions of his plant list have a poetic tone. He writes of two plants:

> The violet has been called the "mirror of the day," but it could only have been an evening sky in the dark of the moon from which the rich deep purple sorts caught their coloring, or it may be that they, together with their primrose and golden hued brethren, are but reflecting sunset splendors.
>
> If, as the name [Dodecatheon] implies, this flower was fashioned by the Twelve Gods of Greece, then their workmanship was of an exquisite sort. One wonders, though, what Olympian escapade may have brought Grecian Gods to even short exile in our hemisphere, since Dodecatheons are altogether American.

His catalogues are the product of his personality and his prodigious knowledge of plants acquired from studying them over the past fifty years. When he is not tending his gardens - to learn first hand the cultural practices he suggests to his catalogue readers - he is reading about plants in his large library of botanical and horticultural works. In his eagerness to learn as much as he can, he has amassed some two hundred works - most of the great floras and a large number of botanical monographs. He will often read one of them while eating his dinner, and it may be a work written in English, French, German, or Latin. When it is time to write his catalogue he carefully checks these references to verify plant names and to prepare descriptive material about the plants. When his own resources fail to provide material he needs, he writes to botanical centers for assistance. One wishes that a greater number of nurserymen and seedsmen had this devotion to accuracy.

While plants have been Rex Pearce's consuming hobby as well as his means of livelihood, he has not limited his horticultural interests to collecting, breeding, and studying plants. He is active in the Men's Garden Clubs of both Hendersonville and Asheville in North Carolina, the Rugby Garden Club of Hendersonville, the American Rhododendron Society, the American Rock Garden Society, and (as a corresponding member) the Royal Horticultural Society. He also finds time to write occasionally for the horticultural press. One chief outside interest is reading - Americana, history, travel, world trends, and natural history, to name a few favorite subjects. Interested in everything he sees, Mr. Pearce travels frequently, often combining plant collecting with sightseeing. At 66, alert and enthusiastic about life, Mr. Pearce says, "Too much to see and do and learn to have any time to get bored, or to rust."

Edwin A. Menninger

Mr. Edwin A. Menninger's acquaintance with the flowering trees of the tropics began about twenty years ago when he and his wife were landscaping their Stuart, Florida, home. Mrs. Menninger asked him to plant showy flowering trees and he, not knowing what kinds there were, proceeded to learn about them. He has been studying, collecting, and growing showy-flowered tropical trees ever since. Today he is known in Florida as "The Flowering Tree Man."

Neither Mr. Menninger's background nor his training indicates any deep interest in plants prior to his quest for tropical trees. He was born March 18, 1896, in Topeka, Kansas, where his father, Dr. Charles F. Menninger, was a physician. The doctor was founder and for many years president of the Menninger Foundation, which has financed medical and psychiatric research and now operates the Menninger Clinic in Kansas. After receiving his degree from Washburn University in 1916, the younger Menninger attended Columbia University's Graduate School and School of Journalism.

Today he publishes the "Stuart News" for his community and maintains a job-printing establishment. The tree nursery is strictly his weekend business-hobby. He finds his journalistic training an advantage in this venture, for he writes, prints, and publishes his own tree catalogues and lists.

His search for showy flowering trees started about 1935 with a thorough canvassing of the local nurseries, where he found a surprisingly limited number of kinds. Consequently, he wrote to every American consul in the tropics for names of local plantsmen to contact about trees. Within a few years he was corresponding with several hundred botanists, village priests, doctors, lawyers, district foresters, agricultural explorers, and housewives. He

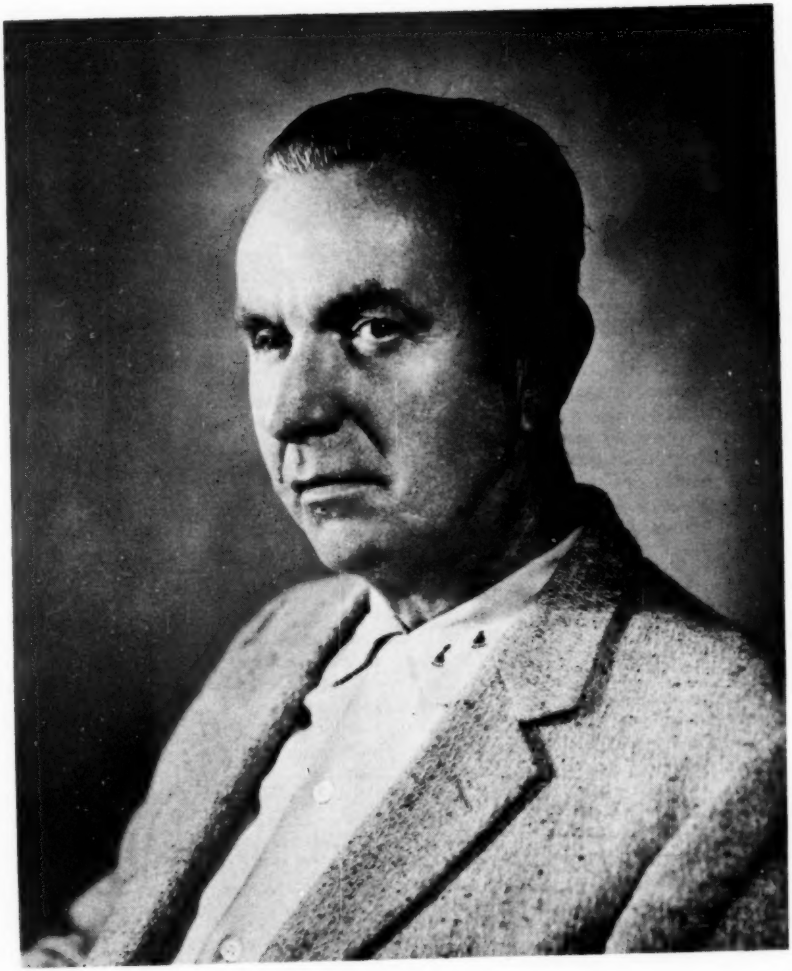


Fig. 19. Edwin A. Menninger.

assembled all the information available in the literature about the flowering trees of each tropical country, including notes about which ones were not yet known in the United States. Copies of these lists were sent to his contacts in each country, with a request for information about the merits of the plants, for pictures of them, and especially for seeds of each. His new acquisitions in trees have grown from about 25 different kinds a year (shortly after he started), to over 500 new kinds in one year.

Necessarily an arm-chair collector because of his full-time publishing business, he has depended on assistance from others. Tree seeds have arrived from every tropical country and come about equally from five areas: Mexico and Central America, South America, Asia, Africa, and Australia-New Zealand. The highest proportion is from Latin America. About half the kinds are supplied by botanic gardens and the others by private collectors.

Although he requests seeds only of trees, he sometimes finds that he has acquired a shrub or vine; and occasionally a plant that grows to be a tree in the tropics will, when grown in Florida's cooler subtropical conditions, develop only to shrublike proportions. Because local demands are not restricted to trees, he also offers shrubs and vines in his catalogues to those who might have need for them. He has a distinct bias against vines, however, and asked in his 1950 catalogue, "But why plant vines when you can grow TREES?"

Mr. Menninger's purpose, other than finding material for his own acre of ground, has been primarily to introduce Florida homeowners to the wide range of showy-flowered tropical trees not previously available for the home landscape. He estimates the number of trees so suited to be more than 3,000 kinds. To encourage interest in the potentials of these trees he has given hundreds of illustrated talks to Florida civic groups and garden clubs. Although many home owners are interested in experimenting in their garden plantings, they are not easily persuaded to plant a tree they have never before heard of nor seen in blossom. Mr. Menninger sums up this reluctance in the introduction to his handbook, "What Flowering Tree Is That?" saying, "We Americans really live our maxim that 'seeing is believing.'" Often after he has extolled the beauty of an especially fine tree that does not happen to be in blossom, in his garden, a visitor may "walk up to some mediocre tree that has flowers on it and exclaim: 'O, isn't that lovely? I must have one of these.'"

His greatest recompense is to receive calls from nurseries saying that their customers are asking for some tropical flowering tree the nurseryman has never heard of. Usually Mr. Menninger supplies the nurseryman with the tree, the customer is satisfied, and the process of beautifying the state with flowering trees advances.

While he does offer his surplus stock for sale and charges for his current handbook (which serves as his descriptive catalogue), the income from these does not contribute to his livelihood. It is a means for him to acquire and grow more trees from the tropics and to finance his nursery work. To procure additional capital he propagates the more common flowering trees in wholesale quantities at his nursery on contract for park departments of several Florida communities. In 1953 Fort Lauderdale bought all of one kind of Pink Trumpet Tree (Tabebuia pallida) he could supply for street plantings. In spite of these sales efforts, he often spends more on his hobby than he earns from it.

Mr. Menninger is responsible for an unusually large number of introductions, considering the short time he has been involved in collecting tropical trees. He believes that 136 of the 576 trees he offers in his 1957 price list are his own introductions. He has brought into his garden many more than this number which he has not succeeded in propagating or which he has rejected as horticulturally unworthy. He is not yet willing to say which of his tree introductions are the most important. Only time and testing in the Florida climate can determine their horticultural merit. However, Harold F. Loomis, botanist in charge of the United States Plant Introduction Garden at Coconut Grove, Florida, told him that he would be famous for his introduction of Melaleuca linariifolia, if for no other tree. This is a magnificent spreading Australian tree of the Bottle-brush family, whose profusion of white flowers in summer is reflected in its common name, "Snow in Summer."

The following are some of the finest flowering trees in the tropics, all introduced, along with many others, by Mr. Menninger:

Alangium Lamarkii
Albizzia Richardiana
Bauhinia Hookeri
Belotia grewiaefolia
Cassia Brewsteri
Cassia leptophylla
Cassia nicaraguensis
Cassia singueana
Cochlospermum vitifolium (double-fld. form)
Dombeya elegans
Dombeya rotundifolia
Erythrina Livingstoneana
Gardenia globosa
Ixora Finlaysoniana
Jacaranda Chelonia
Kopsia fruticosa
Kopsia flavida
Lagerstroemia hirsuta
Lagerstroemia Thorellii
Markhamia obtusifolia
Markhamia platycalyx
Helicteres Isora
Stereospermum Kunthianum
Mussaenda erythrophylla
Baikiaea plurijuga
Erythropsis Barteri
Calycophyllum candidissimum
Brownea macrophylla
Brownea capitella
Brownea latifolia
Platymiscium trinitatis
Michelia Champaca
Lophanthera lactescens
Securidaca longipedunculata
Hebestigma cubense

Reevesia thyrsoidea	Eugenia densiflora var. angustifolia
Mesua ferrea	Napoleona "cereifera"
Millettia ovalifolia	Napoleona imperialis
Dillenia ovata	Ormosia Krugii
Vitex altissima var. alata	Saraca bijuga
Cordia superba var. elliptica	Tabebuia chrysotricha
Eugenia densiflora	Tabebuia heptaphylla

The residents of Stuart have cooperated with him in providing planting areas for his trees. His own acre lot was soon overcrowded. He says that he uses "the whole community as a laboratory" and has "planted thousands of trees in my own yard, other people's yards, street parkways, highway edges, church yards and parks, school grounds and elsewhere." Stuart is a town of 5,000 persons in Martin County, Florida, located 40 miles north of Palm Beach. It is near the mouth of the St. Lucie River, and is protected from the open sea by two narrow strips of land parallel to the coast. Mr. Menninger considers it a good location for testing the sensitivity of his introductions to the salty sea winds and for determining their resistance to hurricane weather.

His garden is open to the public on weekends, the only time he is free to talk with visitors. One sees plantings of all sizes, but primarily of young trees, in the yard around his house. Adjacent to these decorative plantings, seedlings for the trade grow in oil cans or in propagating beds. One of his greatest pleasures has been walking among these trees and talking about them with such renowned botanists and horticulturists as the late David Fairchild, Walter Swingle, John Gifford, Peter Riedel, and Alfred Hottes, and with contemporaries such as Adolph Jordahn, Jeff McBride, E. J. H. Corner, and Hugh Evans.

With the assistance of these men, and staff members at several botanical centers, he has tried to make proper identifications of his trees. His own research takes him to some 700 works in his own botanical and horticultural library. He thus has a good basis for the determinations of his plants and for preparing the descriptions in his catalogues, though he reserves final judgment on the identification of each kind of plant he receives from collectors until the trees have grown to flowering stage.

He impresses on all who purchase his rare trees that they are entering into an experiment with him. He has also expressed, in a motto given in an early catalogue, his belief that "the man who plants a tree becomes a partner with God in a creative act." If even only a few of his introductions find a permanent place in the gardens of our tropical south, Edwin Menninger will still be admired for making a very substantial contribution to our knowledge and appreciation of the tropical flowering trees suited for the Florida landscape.

Cypella Herbertii

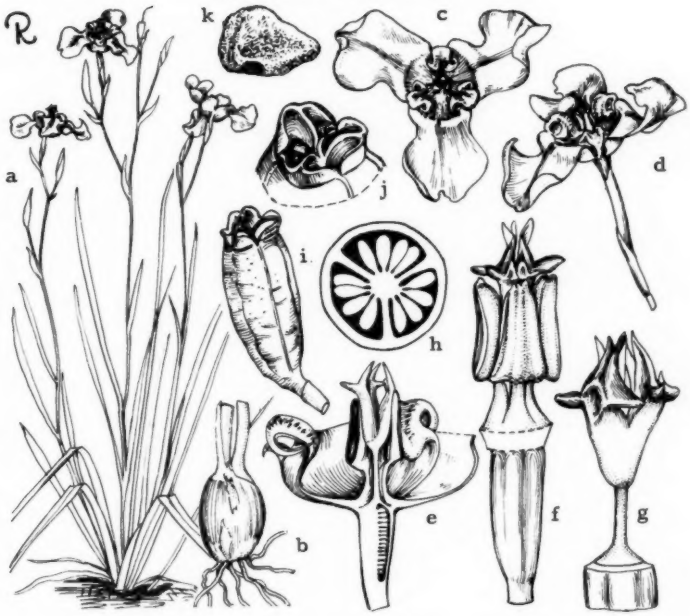


Fig. 20. Cypella Herbertii: a, habit x 1/6; b, corm with leaf bases x 1/2; c, flower, face view x 1/2; d, same, side view x 1/2; e, same, vertical section (segments removed) x 1 3/4; f, flower, less perianth x 2 1/2; g, style and stigma-branches x 2 1/2; h, ovary, cross-section x 6 1/2; i, capsule x 1; j, capsule-valves x 2 1/2; k, seed x 6 1/2.

The subject of the above figure is Cypella Herbertii, a member of the Iris Family and native to southern Brazil, northern Argentina, and adjoining Uruguay. Cypella is a genus of 8 or 9 corm-producing species, flowering the second year from seed, or more easily propagated by cormlets. Though handled like a gladiolus, it may be more desirable to some persons because each plant continues to flower from mid-July until autumn.

The species figured produces burnished coppery-red flowers about 5 cm. across, on delicately slender wiry stems. As in so many members of this family, the individual flowers last but a day, hence are not suited for cutting purposes. Corms should be planted in full sun, and do best in a sandy or well-drained soil to which some humus or peat has been added.

Domestic sources of seed or corms include: Growers Exchange, Farmington, Mich.; Pearce Seed Co., Moorestown, N. J.; John Scheepers, New York, N. Y.; and Oakhurst Gardens, Arcadia, Calif.

G.H.M.L.

Book Reviews

"An Encyclopaedia of Annual and Biennial Garden Plants," by Charles O. Booth. 488 pages, 4 color plates, 80 half-tones, 5 figures (2 unnumbered). Farber & Farber Ltd., London, 1956, and The Macmillan Company, New York, 1957. Price: $12.50.

This volume, wrote its author, "is intended as a reference work covering every aspect of the cultivation of ornamental annuals and biennials in the British Isles, and as a guide to those species at present available for cultivation in Europe and North America." Considering that the text was prepared primarily for British gardeners, it seems reasonably well suited to most American conditions.

The book is divided into two parts. The first comprises five chapters totalling 155 pages covering culture, pests, and diseases. The second is the encyclopedic meat of the volume and is an alphabetic accounting of 368 accepted generic names and of about 1,400 species names, plus a glossary, a listing of English meanings of specific epithets, of common names and those of the plants to which they belong, a compilation of chromosome numbers, of commercial sources in Britain and "abroad" of the plants treated, and of British manufacturers of pesticides and fungicides.

Cultural data appear to be drawn largely from the author's own experiences and, although thus limited, they do represent direct observations and are not the more usual compilations from unknown sources. The terminology is as non-technical as possible without material loss of precision and accuracy from the descriptive accounts. Sizes and dimensions of plants and structures are kept to a minimum and when given are expressed in feet or inches. Colors are given in usual terms without reference to those of the R.H.S. or other color chart.

Several excellent lists appear in the first part: I, plants grown for their flowers, listed alphabetically in height groups with graphic notation on the blossoming period of each species, together with indication of hardiness, and ranges of flower colors; II, foliage plants, with notes on distinctive foliage features and ultimate height of each species; and III, climbers. In addition, there are lists of plants suited for the rock garden, for growing in the shade, and those having scented flowers. Two other lists are of species

important as cut flowers and for dried bouquets. These lists should be helpful to the advanced gardener as well as to the beginner. They are more complete and provide more information than similar lists known in earlier American works.

At first glance the price of this book may seem high. It is, when compared with the usual gardening handbook, but this volume not only is more up-to-date than any other on the subject but also gives an abundance of information about a larger number of kinds of plants than is to be found in any other book on annuals and biennials. Its photographic reproductions are not only of high quality, but most are of species not commonly illustrated.

Aside from the comparatively but justifiedly high price, the most apparent limitations of this encyclopedia lie in those parts relating to culture, pests, and diseases which have been written for British rather than American conditions. Nevertheless, the book deserves a place on the desk of every gardener interested in these plants, and is a must for all libraries having a section on garden literature.

G. H. M. L.

"Native Plants for California Gardens," by Lee W. Lenz. 166 pp., with 1 color plate, 100 half-tones. Rancho Santa Ana Botanic Garden, Claremont, California. 1956. Price: $3.85.

Dr. Lee W. Lenz is a member of the staff of the Rancho Santa Ana Botanic Garden at Claremont (Los Angeles County), California, and so has had ample opportunity to observe under cultivation the plants of which he writes, for the Botanic Garden has devoted many years to botanical and horticultural work with the native plants of California.

Most of the kinds of plants included in this book have been selected actually for their particular suitability to gardens of southern California, though the majority may be grown in other parts of California also. All of the annuals and bulbs, a few of the perennials, and two or three of the trees and shrubs may be grown even in New York State, and some have, in fact, become favorite and familiar garden plants in the East. In European, especially in British, gardens, Californian plants have been known and enjoyed for many, many years, for several plant-hunters were sent out from Europe in the early 1800's particularly to obtain seeds and plants of Californian material for their avid sponsors.

One hundred and one species have been chosen by Dr. Lenz for special notice here and are individually concisely described, with information on their distribution in nature, methods of propagation, and uses in the garden-landscape. The nomenclature used has obviously been carefully checked, and synonyms have been mentioned where the author has considered it advisable. Nearly every featured species is illustrated by at least one photograph, and these photographs are uniformly excellent. An additional number of worthwhile sorts are discussed more briefly, in conjunction with some of the more favored species to which they are related. The plants included in such a relatively small selection, from the more than four thousand species of higher plants to be found growing wild in California, will inevitably be challenged by those who have their own favorites, and this the author has anticipated in his Foreword. "Selection of the species ... was made from the results of almost a quarter of a century of work in growing natives by the Rancho Santa Ana Botanic Garden and there is a special reason for the choice of each plant," he says there. The reasons then given for including or excluding particular plants or groups of plants are valid enough, but are in themselves proof that the "special reason" for the resultant choices is still colored somewhat by personal preference.

In addition to the detailed catalogue of recommended species, there are chapters devoted to the botanical characteristics of the California flora, the propagation and handling of native plants, their uses (including special planting lists), and an especially interesting and valuable summary of the work of the early botanical and horticultural collectors of Californian plants. A brief list of references and an index complete the work.

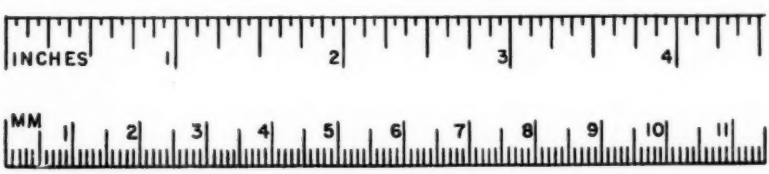
As the author has noted in his Introduction, one of the reasons for the general neglect of Californian plants by Californian horticulturists in the past has been the inability of the public to obtain them from nurseries. Today, many local nurseries in California offer for sale a number of native plants, though many kinds, even of those recommended in this book, may not at present be available through any commercial channels.[1] However, part of this neglect has been attributed also to the gardening public's ignorance of the decorative possibilities or the cultural requirements of the natives. Dr. Lentz's book should do much to foster the awakening interest in this group of plants by stimulating desire for the most attractive of them and by helping make their successful culture less uncertain.

W.J.D.

[1] The names of the few dealers who specialize in seeds and plants of Californian natives and who do a mail-order business may be found in an earlier issue of Baileya ("Sources of native Temperate-American Plants." Baileya 2: 124, 125 [December, 1954]).

ABBREVIATIONS USED IN BAILEYA

ann.	annual	dm.	decimeter	lf.	leaf
bien.	biennial	fl.	flower	lft.	leaflet
br.	branch	fls.	flowers	lvs.	leaves
brt.	branchlet	flt.	floret	mm.	millimeter
caps.	capsule	fr.	fruit	per.	perennial
cl.	clone	ft.	foot	segm.	segment
cm.	centimeter	hort.	horticultural	st.	stem
cv.	cultivar	in.	inch	sts.	stems
diam.	diameter	infl.	inflorescence	var.	variety

METRIC - ENGLISH EQUIVALENTS (approximate)

6 mm. - 1/4 in.	10 cm. - 4 in.	10 mm. - 1 cm.
12 mm. - 1/2 in.	1 dm. - 4 in.	10 cm. - 1 dm.
25 mm. - 1 in.	3 dm. - 1 ft.	10 dm. - 1 meter
2.5 cm. - 1 in.	10 dm. - 1 yd.	
5 cm. - 2 in.	1 m. - 39 in.